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ABSTRACT

This report documents the five recommendations made by the Florida Education Standards Commission relating to elementary teacher preparation. The recommendations are focused on teacher education program approval as well as on certification criteria. A review of preservice preparation of elementary teachers includes a survey of elementary principals in Florida regarding their perceptions of the preparation of elementary teachers, an analysis of randomly selected transcripts of individuals certified in elementary education in Florida, and a review of current preservice elementary education requirements. The five recommendations are: (1) the level for initial certification in elementary education should be K-6; (2) initial certification should be granted on the basis of graduation from a state approved elementary education program; (3) state developed preservice elementary program guidelines and indicators should serve as the state approval of elementary education programs; (4) an alternate teacher preparation program should be established; and (5) strong collaboration is needed between colleges, school districts, private institutions, and involved divisions of the Florida State Department of Education. Documentation is provided on the recommendations. (JD)

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PREPARING ELEMENTARY TEACHERS FOR FLORIDA'S CLASSROOMS

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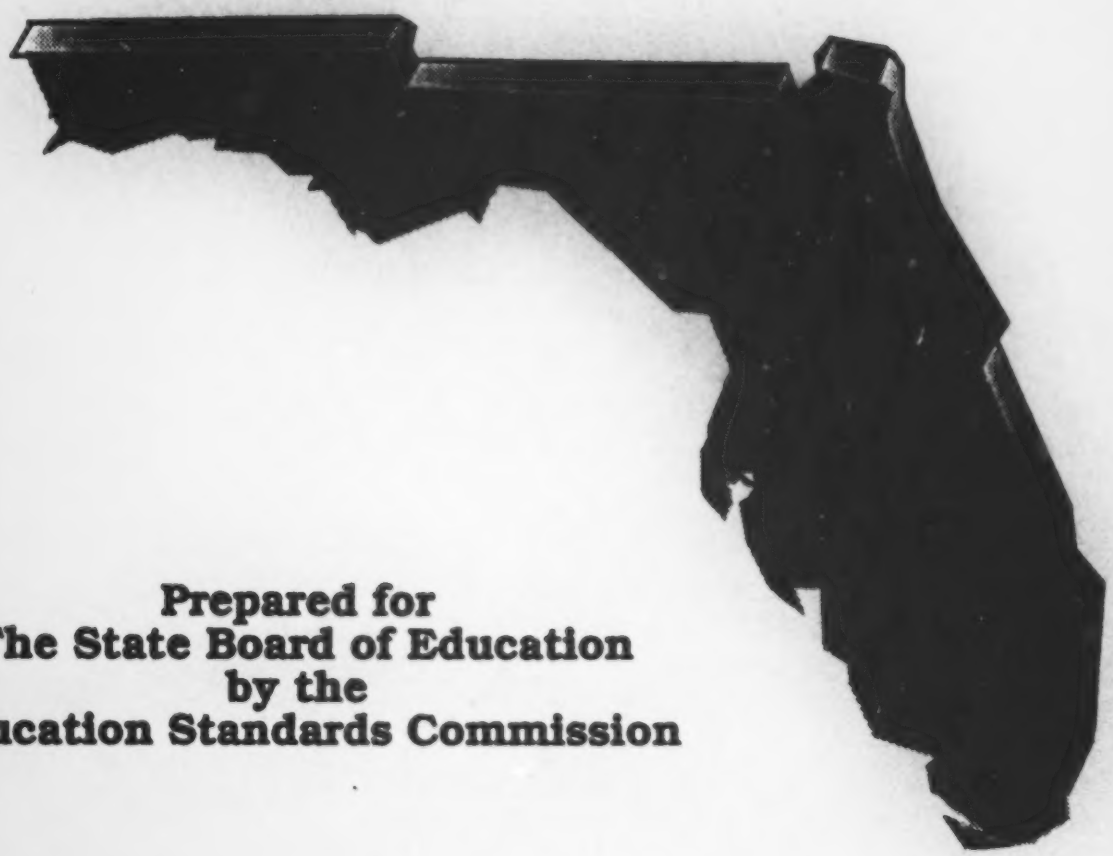

Prepared for
The State Board of Education
by the
Education Standards Commission

April, 1990

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EDUCATION STANDARDS COMMISSION
325 West Gaines Street, Suite 301
Tallahassee, Florida 32399
904/488-1523

April, 1990

The Honorable Bob Martinez
Governor, State of Florida
Chairman, State Board of Education
The Capitol
Tallahassee, Florida 32399

Dear Governor Martinez:

The Education Standards Commission is pleased to submit to you, the members of the State Board of Education and to the Florida Legislature, a report entitled: Preparing Elementary Teachers for Florida's Classrooms. This report was prepared in response to a direct request by the State Board of Education and pursuant to Section 231.546(1)(b), Florida Statutes.

One of the goals included in the report, A Comprehensive Plan for Improving Mathematics, Science, and Computer Education in Florida, was to "improve preservice and inservice programs" for elementary teachers. The focus of the Commission's report is the preservice preparation of elementary teachers. The Commission is making five recommendations which address program approval guidelines, initial certification, alternate preparation programs, and stronger collaboration among all related agencies and institutions who are interested in preparing elementary teachers.

The Education Standards Commission urges the members of the State Board of Education and the Florida Legislature to adopt this report and to direct the implementation of the proposed recommendations.

Sincerely,

Doretha B. Fedrick

Doretha B. Fedrick
Chair

DBF/CSM/c

Tallahassee, Florida 32399

Affirmative action/equal opportunity employer

EDUCATION STANDARDS COMMISSION

PREPARING ELEMENTARY TEACHERS

for

FLORIDA'S CLASSROOMS

APRIL, 1990

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The members of the Education Standards Commission thank the many offices and individuals who provided information, assistance, advice, and expertise to the research and preparation of this report on the preservice preparation of elementary school teachers in Florida. Contributors have included staff in the Department of Education, including the Division of Human Resource Development, Bureaus of Teacher Certification and Teacher Education; the Bureau of Elementary and Secondary Education, and Bureau of Program Support Services in the Division of Public Schools; the Office of Policy Research and Improvement; and the Office of Strategy Planning and Management Information Systems in the Deputy Commissioner's Office.

Numerous faculty in Florida's colleges and universities provided presentations, written information, and their professional services to the Commission. Others cooperated by providing data in response to queries concerning their individual preservice programs.

The Commission members are especially appreciative of those elementary school principals who completed and returned the surveys on their perceptions of the preservice training of their recently hired elementary teachers. District-level school officials also generously responded to the Commission's request for information.

Finally, those individuals who presented oral testimony at the public hearings or who forwarded their written remarks and advice are thanked for their time, energy, and concern to inform the Commission of their views concerning the Commission's recommendations for the preservice preparation of elementary teachers.

The Commission wishes to extend a special note of thanks to Dr. Adeniji Odutola, Mrs. Judy Etemadi, and Mrs. Cheryl Etters for their efforts in the preparation of this report.

RECOMMENDATIONS FOR THE PRESERVICE PREPARATION OF ELEMENTARY TEACHERS FOR INITIAL CERTIFICATION

EXECUTIVE SUMMARY

The Education Standards Commission, in its responsibility as an advisory body to the State Board of Education and the Legislature, is advocating a departure from the current practices in preparing elementary school teachers at the preservice level for initial certification. Section 231.546, Florida Statutes, charges the Commission to make recommendations in the areas of preservice education, certification requirements, inservice activities and other personnel related matters. The Commission looks at improving personnel for the purpose of improving the educational opportunities for Florida's children.

The Commission is making five recommendations relating to elementary teacher preparation based on the members' conviction that merely modifying current programs, processes, and practices for initial certification is not the answer for producing more effective teachers. The Commission is advocating moving away from basing initial certification on numbers of hours and/or numbers of credits in specialized course requirements obtained by an individual.

In advocating these changes, the Commission has focused its recommendations on teacher education program approval as well as certification criteria. The Commission is presenting guidelines and indicators for approving programs in elementary education which they believe will facilitate elementary teachers acquiring competencies needed in the classroom. **The universities and colleges should be accountable for determining their individual elementary education programs and implementing the components necessary to produce these competencies for initial certification.**

Although the major focus of this study and these recommendations has been in the area of preservice preparation of elementary teachers, the Commission strongly advocates lifelong learning for all teachers, especially in regard to strengthening teaching competencies as well as enhancing personal growth. Therefore, the Commission encourages continual participation in inservice activities throughout the lifetime of a professional teaching career.

The Education Standards Commission is offering these recommendations as a result of a study conducted at the request of the State Board of Education. The Commission was directed to study the preparation of elementary teachers in the areas of mathematics, science, and computer education. The Commission added to its study the area of geography since concerns were also raised about this discipline.

The following recommendations are offered as a result of the Commisssion's study, as well as testimony presented on the initial and revised recommendations from the first public hearing held in Tampa, on January 25, 1990, and subsequent hearings held during the week of February 27 - March 1, 1990, in Miami, Orlando, Gainesville, and Pensacola.

The proposed recommendations are based on a number of assumptions. The assumptions form a pattern which provide a strong framework for the preservice preparation of elementary teachers for initial certification.

The assumptions include the following:

1. *The preservice preparation of elementary teachers must be a partnership among an array of institutions - community colleges, numerous departments and schools within four-year colleges and universities, school districts, teacher organizations, the elementary schools, and appropriate divisions of the Florida Department of Education. A cliche may be appropriate - any preparation is only as strong as the weakest link in the partnership.*

2. *The preservice preparation must be based on the linkage of appropriate research to the best known practices.*

3. *The guidelines outlined in this report establish directions and goals, not a specific "laundry list" of prescribed courses.*

4. *The focus of the recommendations is not based on the needs of various institutions; the needs of children are at the core of the recommendations.*

With these recommendations put forth, the Education Standards Commission urges that readers view these recommendations, not within the context of how they affect what is current practice, but rather as a larger view of what is necessary for children to reach their potential in the future.

RECOMMENDATION 1

The level for initial certification in elementary education should be K-6.

RECOMMENDATION 2

Initial certification of elementary teachers in Florida and from other states for grades K-6 should be granted on the basis of graduation from a state-approved elementary education program.

RECOMMENDATION 3

The Education Standards Commission is recommending preservice elementary program guidelines and indicators that should serve as the criteria for state approval of elementary teacher education programs for teachers preparing to work with children in grades K-6 (see "Recommendations with Rationale" for these guidelines and indicators).

RECOMMENDATION 4

An alternate teacher preparation program should be established for grades K-6 elementary teachers in Florida. Guidelines should be developed for alternate teacher preparation programs for grades K-6 elementary teachers.

RECOMMENDATION 5

It is essential that there be strong collaboration between the colleges of education, colleges of arts and sciences, community colleges, school districts, private institutions, and involved divisions of the Florida Department of Education.

INTRODUCTION

BACKGROUND

The Education Standards Commission is committed to its mandate to improve Florida's educational system through improving educational personnel. Recent professional literature in articles, reports, statistics, and other forms of information advises the nation that its educational system, particularly the public school systems for grades Kindergarten through 12, is operating inadequately to meet the society's needs, especially in regard to the skills necessary in the future work force. The apprehension continues to appear daily in the news media that the United States will not be able to compete in a global market place with the techniques of the Information Age. An example of such concern is the report by the National Science Board Commission on Precollege Education in Mathematics, Science, and Technology (1983) which concludes that the United States is failing to provide its own children with the intellectual tools needed for the future.

Similar recent Florida literature calling for educational reform has focused on mathematics, science and computer education. A report by the Florida Chamber of Commerce, the Florida Education and Industry Coalition and the Department of Education (1989) noted that there are "disturbing gaps between what future workers in Florida should know and what today's students in Florida are learning". The report, A Comprehensive Plan for Improving Mathematics, Science, and Computer Education in Florida, called for a comprehensive plan to improve mathematics, science and computer education through the adoption of five goals, including preparing more qualified teachers, and teaching through the integration of curriculum. The State Board of Education adopted the report. The State Board then directed the Education Standards Commission to prepare recommendations on the preparation of elementary teachers in the areas of mathematics, science and computer education. The Commission added to its charge the area of geography, since similar concerns have been raised recently about this discipline in the context of global education.

METHODOLOGY

The Education Standards Commission first examined current literature on the preparation of elementary teachers and reviewed recommendations of professional associations. The Commission then designed and implemented a data collection plan to learn what is being studied, what is currently required in Florida's preservice elementary education programs, and to gather perceptions about training. The data collection activities focused in the areas of mathematics, science, computer education and geography. Specifically, the Commission (a) examined the preservice preparation hours and credits of randomly selected individuals in the current pool of persons certificated in elementary education; (b) surveyed elementary school principals for their perceptions of the adequacy of preparation of recently hired beginning teachers; (c) reviewed the elementary teacher preservice

preparation programs as they are presented in current college catalogs; and (d) reviewed the community college A.A. degree program requirements, and made inquiries concerning communications between the state university preservice programs and the neighboring community colleges.

The Education Standards Commission studied the findings of its research and offered six initial recommendations for preservice programs in elementary education. The Commission then held a public hearing on January 15, 1990 in Tampa, Florida, to receive testimony on the initial recommendations. Based on the oral and written testimony received, the Commission revised some components of the recommendations and combined two others. The revised recommendations were presented at four additional public hearings. These hearings were held in Miami, Orlando, Gainesville, and Pensacola during the week of February 26 through March 2, 1990.

Based on issues raised at the public hearings and communication with various divisions of the Department of Education, the Commission revised the initial and second set of recommendations. On March 9, 1990, the Commission approved the five recommendations presented in this report. **The five recommendations address initial certification levels, state approved programs, guidelines and indicators to serve as criteria for state approval of teacher education programs in elementary education, alternate preparation programs for elementary teachers, and collaboration among all related agencies and institutions.**

Based on its research and the public hearings, the Commission concluded and affirmed in the five recommendations, that initial certification must be based on the successful completion of programs which lead to competencies, not on specific courses taken and credit hours accumulated. The universities and colleges should design, develop and implement their preservice programs based on preparing their students to acquire competencies necessary to effectively teach in the elementary classrooms. The universities and colleges should be held accountable for preparing prospective elementary teachers. The vehicle for this accountability is the state program approval process, and initial certification in elementary education should be based on graduation from an approved program.

DATA COLLECTION

The Commission collected the data for this study in four phases. First, randomly selected transcripts of in-state and out-of-state individuals who are currently certified in elementary education in Florida were analyzed. The Bureau of Teacher Certification in the Department of Education (DOE) provided a list of all individuals currently certified. Credential files of 1076 individuals were randomly selected for analysis. These transcripts covered a period of time from 1946-1989. Data on the transcript analysis were collected from two separate samples: one of in-state and out-of state graduates who graduated from 1946 to 1988 and a second sample of in-state graduates from 1987 to June of 1989. The analysis of the first sample was conducted in an effort to get a better picture of the pool of people who are qualified to be hired or are already working as elementary teachers. It was thought that an analysis of such a large sample of individuals would provide the state with

various supply and demand data and also information relevant to inservice needs. The analysis of the sample of very recently graduated individuals was conducted in order to provide data which was reflective of the preparation of persons who graduated from in-state institutions within the last two years. The file transcripts were systematically examined for content and methods (pedagogy) courses in credit hours in mathematics, science, computer education, and geography.

For the second phase, **a survey was sent to all elementary principals in Florida to determine their perceptions on the adequacy of training and the readiness of their recent elementary graduates to teach mathematics, science, geography, and to use computers in the classroom. The survey instrument was developed by a team of faculty members from Florida State University and staff at the Department of Education.**

Three hundred fifty-eight (358) elementary principal surveys were received. However, the data analyses for any given question on the survey does not reflect that number because not all principals responded to all questions.

The Commission used descriptive statistics (cross tabulation, frequency distribution, mean, percentage) through the utilization of the Statistical Package for the Social Sciences (SPSS/PC+) to analyze the data collected in the first two phases, transcript analyses and the principal surveys.

The third phase of the data collection consisted of **a review of the current catalogs of the 28 teacher training institutions and selected public community colleges in Florida. Telephone interviews of those individuals responsible for advising students in the nine public universities, several private institutions, and selected public community colleges were conducted to verify information in the catalogs as reflective of current practices.**

The section of the report, entitled "The Review of Preservice Preparation of Elementary Teachers", presents in detail the data collected and the information produced which provided a research base for the Commission's recommendations. The final section of the report provides the recommendations for the preparation of elementary teachers in Florida and rationale for these recommendations.

SURVEY OF ELEMENTARY PRINCIPALS IN FLORIDA REGARDING THEIR PERCEPTIONS OF THE PRESERVICE PREPARATION OF ELEMENTARY TEACHERS

The Education Standards Commission determined that one appropriate source of information concerning job performance and preparation adequacy of elementary teachers would be the school principals who interview and hire recently graduated teachers into their elementary schools. As one part of the overall data collection design, a survey instrument was developed by faculty at Florida State University and staff of the Education Standards Commission. The instrument was designed to survey principals concerning their perceptions of the preparation of elementary teachers in the areas of mathematics, science, computer use in the classroom, and geography. The survey was then distributed to all elementary principals in the state; 358 principals responded.

The surveys asked principals to identify both strengths and weaknesses of the beginning teachers whom they had hired and to suggest how educational institutions might assist new teachers in becoming proficient in the four areas. The survey had four sections. On Section A the principals responded on a Likert Scale from "strongly agree" to "strongly disagree" to statements regarding the training of recently graduated elementary teachers. Section B provided principals with opportunities to elaborate on their responses and to comment by listing their teachers' strengths and weaknesses in each discipline. Section C asked principals to suggest improvements in university programs to prepare teachers in the four subjects. The fourth part asked principals to identify the problems they face in implementing exemplary programs in mathematics, science, geography, and the use of computers to enhance learning. The principals were also asked to list important characteristics of exemplary elementary teachers in mathematics, science, and geography. (See Appendix A for the instrument, "Survey on the Preparation of Elementary Teachers".)

Section A - Survey Results: Perceptions of Elementary Principals Regarding the Preservice Training of Recently Graduated Elementary Teachers

The principals' responses to the Likert scale regarding the preservice preparation of recently graduated elementary teachers revealed that the principals judged new teachers' abilities to teach mathematics as their strongest subject among the four identified areas, which included: science, computers in the classroom, and geography. Seventy percent (70%) of the principals agreed that their recently graduated elementary teachers were well prepared to teach mathematics and sixty-seven percent (67%) agreed that their recently graduated elementary teachers were able to develop curricula in mathematics. However, fifty-six percent (56%) responded positively and forty-five percent (45%) responded negatively to the statement that teachers are able to teach mathematics to emphasize problem solving (see Table 1).

In regards to science, sixty-eight percent (68%) of responding principals disagreed with the statement that recently graduated elementary teachers are well prepared to teach science and eleven percent (11%) strongly disagreed. Sixty percent (60%) disagreed with the statement that elementary teachers are able to develop curricula in science and fifty-six percent (56%) disagreed with the statement that elementary teachers are able to teach earth, life, and

physical science as a coherent sequence of core topics. Fifty-nine percent (59%) disagreed with the statement that elementary teachers were able to teach science in a hands-on and problem centered manner (see Table 1).

Principals also responded with dissatisfaction over teacher preparation in using computers and integrating computers in instruction. Seventy-nine percent (79%) disagreed with the statement that elementary teachers were well prepared to use computers to enhance student learning and seventy-six percent (76%) disagreed with the statement that elementary teachers were able to develop curricula in computer education. Seventy-four percent (74%) of the responding principals disagreed with the statement that elementary teachers are able to integrate computer technology with other subjects such as mathematics, science, and geography (see Table 1). In geography, sixty percent (60%) of the responding principals disagreed with the the statement that elementary teachers were well prepared to teach geography (see Table 1).

TABLE 1

Frequency Distribution of Elementary Principals' Responses To Questions 1-11 of the Survey Instrument *

Survey Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
Elementary teachers are well prepared to teach mathematics.	7%	63%	27%	3%
Elementary teachers are able to develop curricula in mathematics.	4%	63%	29%	3%
Elementary teachers are able to teach mathematics in a manner that emphasizes problem solving.	5%	51%	40%	5%
Elementary teachers are well prepared to teach science.	3%	29%	57%	11%
Elementary teachers are able to develop curricula in science.	2%	38%	54%	6%
Elementary teachers are able to teach earth, life, and physical science as a coherent sequence of core topics.	2%	42%	51%	5%
Elementary teachers are able to teach science in a hands-on and problem centered manner.	3%	38%	48%	11%
Elementary teachers are well prepared to use computers to enhance student learning.	1%	19%	64%	15%
Elementary teachers are able to develop curricula in computer education.	1%	23%	60%	16%
Elementary teachers are able to integrate computer technology with other subjects such as mathematics, science, and geography.	1%	26%	61%	13%
Elementary teachers are well prepared to teach geography.	2%	38%	53%	7%

* Note: Survey questions listed in this table are reflective of the descriptions in the narration and are not listed in the same order as on the principal's survey instrument.

Section B - Survey Results: Strengths and Weaknesses of Recently Graduated Elementary Teachers as Perceived by Responding Elementary Principals

The second part of the survey provided the principals with opportunities to elaborate on their responses to the Likert Scale statements presented in Section A by listing strengths and weaknesses of their recently graduated teachers in the four identified areas. Their responses were typically in a few brief statements. These qualitative data were analyzed and coded into categories on commonality of responses. Observations of their comments are described for each area surveyed.

Mathematics

Of the principals who responded, 26.9% felt that the greatest strength of recently graduated elementary teachers in mathematics was in their use of hands-on and manipulative materials. At the same time, 24.6% of the principals who responded identified the use of manipulative or other hands-on activities to be a weakness of recently graduated teachers.

In knowledge of mathematics, twenty-on percent (21%) of the responding principals perceived their new teachers' knowledge of mathematics to be a strength, while 21.3% of the principals believed that recently graduated elementary teachers were lacking in how to teach problem solving skills.

According to the responses received from the surveys, principals appear to believe that mathematics should be taught using a hands-on approach. They believe that, in order for teachers to be competent in teaching mathematics, they must not only have been educated in appropriate methods, but also have developed a high level of content knowledge (for further analyses, see Table 2).

TABLE 2

Frequency Distribution
of the Strengths and Weaknesses of Recently Hired Elementary Teachers
in Teaching **Mathematics**
as Perceived by the Responding Elementary Principals

STRENGTHS	N	%	WEAKNESSES	N	%
Use of hands-on manipulatives	68	26.9%	Use of manipulatives/hands-on or real life relationships	51	24.6%
Knowledge base in content area	52	20.6%	Knowledge base in content area	46	22.2%
Adequate, no specific strengths listed	40	15.8%	Ability to teach problem solving skills	44	21.3%
None observed	24	9.5%	Pedagogical knowledge	18	8.7%
Pedagogical knowledge	20	7.9%	Ability to work with all levels of students and diagnose	15	7.3%
Knowledge of scope and sequence	13	5.2%	Knowledge of children's developmental stages	12	5.8%
Use of innovative methods	11	4.4%	Experience with subject area	11	5.3%
Personal characteristics - enthusiasm, commitment to teaching	7	2.8%	Ability to integrate subject into whole program	4	1.9%
Ability to do drill and practice	6	2.4%	Personal characteristics - fear of subject	3	1.4%
Teach problem solving skills	4	1.6%	Ability to manage classroom	2	1%
Use of textbooks	2	.8%			

N = 252 N = 207

Science

In the area of science, similarities to strengths and weaknesses in mathematics were observed by the principals who responded. Of the responding principals, 26.9% viewed strengths of new teachers in science as the use of hands-on science activities while 19.5% viewed their teachers knowledge of science as a strength. At the same time, 18.5% of those who responded did not observe any strengths in science teaching.

In identifying weaknesses of new teachers in science teaching, 35.9% of the principals indicated that new teachers' knowledge of science was not adequate, and 30.7% percent indicated a lack of hands-on science teaching as a weakness. Some principals (10.4%) noted fear of the subject as a reason teachers did not provide appropriate science experiences for their students as shown on Table 3.

TABLE 3

Frequency Distribution
of the Strengths and Weaknesses of Recently Hired Elementary Teachers
in Teaching **Science**
As Perceived by the Responding Elementary Principals

STRENGTHS	N	%	WEAKNESSES	N	%
Use of hands-on and manipulatives	56	26.9%	Knowledge base in content area	83	35.9%
Knowledge base in content area	39	19.5%	Use of manipulatives/hands-on or real life experiences	71	30.7%
None observed	37	18.5%	Personal characteristics	24	10.4%
Adequate, no specific strengths listed	21	10.5%	Pedagogical knowledge	18	7.8%
Personal characteristics - enthusiasm, commitment to teaching	11	5.5%	Experience with subject area	11	4.8%
Pedagogical knowledge	11	5.5%	Ability to integrate with other subjects	8	3.5%
Use textbooks only	10	5.0%	Ability to teach problem solving skills	7	3.0%
Knowledge of scope and sequence	9	4.5%	Ability to work with all levels of students	5	2.2%
Use innovative methods	5	2.5%	Ability to motivate students	2	.9%

N = 200 N = 231

Computer Education

In the use of computers at the elementary level, 35.8% of the principals who responded did not observe that their teachers use computers appropriately. Principals wrote that fear of the computer, lack of experience with computers, and lack of knowledge of software were preventing their teachers from using computers appropriately (see Table 4).

Although 25.4% of the principals listed content knowledge in computers as a strength among their teachers, it was identified as a strength only in comparison to the fact that veteran teachers had little computer literacy and new teachers had at least some knowledge of computers. Another 55.2% of the principals responding indicated computer knowledge as a weakness for new teachers (see Table 4).

TABLE 4

Frequency Distribution
of the Strengths and Weaknesses of Recently Hired Elementary Teachers
in **Using Computers**
As Perceived by the Responding Elementary Principals

STRENGTHS	N	%	WEAKNESSES	N	%
None observed	72	35.8%	Knowledge of content area	112	55.2%
Content knowledge limited to word processing	51	25.4%	Fear of computers	23	11.3%
Personal characteristics - enthusiasm, commitment	25	12.4%	Experience with subject matter	21	10.3%
Adequate, no special skills noted	24	11.9%	Knowledge of software	20	9.9%
Pedagogical knowledge	9	4.5%	Pedagogical knowledge	10	4.9%
Ability to integrate with other subjects	7	3.5%	Ability to integrate with other subjects	8	3.9%
Knowledge of computer software	3	1.5%	No hands-on	4	2.0%
Use of hands-on	2	1.0%	Ability to manage classroom	2	1.0%
Knowledge of scope and sequence	2	1.0%			
Innovative methods	2	1.0%			
Use of drill skills	2	1.0%			

N = 201 N = 203

Geography

In geography, 35.5% of the responding principals did not observe any strengths in their recent graduates in teaching geography. Some principals (22.4%) noted that teachers were able to teach map and globe skills, and 13.1% believed the teachers were performing adequately as shown in Table 5.

When asked to list their new teachers' weaknesses in teaching geography, 64.6% of the responding principals indicated that their teachers did not have sufficient content knowledge; they often noted particular weaknesses in map and globe skills. Other principals indicated a weakness in pedagogical knowledge, not using enough hands-on activities, and others expressed concern that teachers were unable to integrate geography concepts into other areas, particularly social studies (see Table 5).

TABLE 5

Frequency Distribution
of the Strengths and Weaknesses of Recently Hired Elementary Teachers
in Teaching **Geography**
As Perceived by the Responding Elementary Principals

STRENGTHS	N	%	WEAKNESSES	N	%
None observed	65	35.5%	Knowledge base in content area - maps and globes	133	64.6%
Content knowledge	41	22.4%	Pedagogical knowledge	16	7.8%
Adequate, no specific strengths listed	24	13.1%	Use of hands-on or manipulatives	15	7.3%
Use of hands-on and manipulatives - maps and globes	13	7.1%	Ability to integrate into social studies program	14	6.8%
Personal characteristics - enthusiasm, commitment to teaching	11	6.0%	Experience with subject area	9	4.4%
Knowledge of scope and sequence	10	5.5%	Ability to motivate students	7	3.4%
Use innovative methods	8	4.5%	Lack of interest in subject	6	2.9%
Pedagogical knowledge	4	2.2%	Ability to work with all levels of students	6	2.9%
Use of textbooks	3	1.6%			
Drill skills	2	1.1%			

N = 183 N = 206

Section C - Survey Results: Improving Preservice Education: Suggestions From Responding Elementary Principals

When making suggestions for improving the preservice preparation of elementary teachers, 47.2% of the responses suggested improvement in university science education by requiring more training in the use of hands-on activities in science. Of the responding principals, 25.2% indicated that more science courses should be required, while 13.8% indicated a need for more methods courses in science teaching.

Of the responding principals, 34.1% recommended more training in the use of hands-on and manipulatives in mathematics; 23% required more mathematics courses; 11.9% required more methods courses in mathematics; and 11.1% recommended training in teaching problem solving skills.

In geography, 52.7% of the responding principals suggested that universities should require more content area courses in geography for students studying elementary education. Some principals (17.2%) recommended the introduction of additional methods courses specific to geography.

In geography 15.4% of the responding principals indicated that geography should be taught through integrating it with social studies. Many stated that there is not enough time in the school day to teach geography as a separate discipline.

In the area of computers, 56.9% of the responding principals indicated a need for more computer courses to include use and selection of software. Some of the responding principals (20.7%) suggested requiring more methods courses in computers; and 11.7% of the principals indicated that university programs should provide use of hands-on training in computers. Several felt that a specialist teacher was needed in the school and that there should be a computer laboratory at the school.

Section D - Survey Results: Problems in Implementing Exemplary Programs as Perceived by Responding Elementary Principals

In Section D, the principals were asked to identify the problems they faced in implementing exemplary programs in mathematics, science, geography, and the use of computers to enhance learning. Although the principals again noted a number of factors which were related to the weaknesses they observed in the beginning teachers (lack of content knowledge and lack of use of hands-on/problem solving lessons), the greatest problem stated by principals was a lack of funding. They remarked that money was not available to buy computers and software, hands-on materials for science and mathematics, or maps and globes for geography. Furthermore, they indicated a need for money to build laboratory facilities because their classrooms are not equipped to teach science, and to provide inservice for teachers to update their skills in teaching these subjects.

Another major concern indicated by the principals who responded was a lack of time in the school day. Principals wrote that their teachers, in addition to teaching reading, writing, and mathematics, were required to teach

social studies, music, art, physical education, AIDS education, sex education, gun safety as well as preparing students for testing. Some stressed the need for a longer school day.

Finally, principals were asked to specify the **three most important characteristics of exemplary teachers in the areas of mathematics, science, and geography**. Four major characteristics were noted by the principals:

1. A good knowledge of the subject;
2. Use of a variety of methods that are creative and innovative;
3. Use of a hands-on approach to lessons; and,
4. Enthusiasm, energy, and dedication.

SUMMARY

The results of the survey regarding the perceptions of principals with respect to the preservice preparation of elementary teachers and their ability to develop and implement curricula in mathematics, science, geography, and computers indicated that the principals who responded felt that elementary teachers are adequately prepared to teach mathematics. However, principals have not observed adequate preparation in science, geography, and the use of computers.

Solutions for addressing the identified weaknesses were proposed by the principals. Highest priority was to require more emphasis in education programs on hands-on and manipulative materials for mathematics and science. To resolve the weaknesses in geography and the use of computers, principals recommended more content. The recommendations for more content and methods courses were the most frequently listed suggestions of the respondents for all four categories. The complete study on the analysis of surveys of Florida principals regarding the preparation of elementary teachers in the areas of mathematics, science, computer technology, and geography is available as a separate document.

The Commission feels that further research is needed to gather additional data on principal perceptions on the preparation of elementary teachers. A logical follow-up to this study, therefore, is a series of intensive interviews of principals of schools where there are exemplary programs in one or more of the four areas. Further data that are needed include: detailed information regarding where teachers who are active in such programs were educated; the type of induction programs that are in effect in those schools; and the kind of support that is provided to new teachers. Even more important, however, is the need for information about the backgrounds of principals in those schools and their beliefs about how science, mathematics, geography and computers should be taught.

Consequently, an intensive interpretive study is planned. Sixteen principals from schools with exemplary programs in these areas will be interviewed regarding these concerns and the results published.

ANALYSIS OF RANDOMLY SELECTED TRANSCRIPTS OF INDIVIDUALS CERTIFIED IN ELEMENTARY EDUCATION IN FLORIDA

1: Methodology

The Commission systematically examined 1076 college transcripts of randomly selected files from the teaching pool of individuals certified in elementary education in Florida. The transcripts were provided by the Bureau of Teacher Certification, Division of Human Resource Development, Florida Department of Education. No means were available to determine if the certificated individuals who were randomly selected were actually employed in any Florida's 67 school districts. The total sample of transcripts were of graduates from 1946-June, 1989. The following limitations were evident concerning the transcript analyses:

- The Bureau of Teacher Certification was not able to provide information concerning individuals certified in elementary education and their current teaching status.
- As a result, the analysis of transcript data is based strictly on those individuals who are currently certified in elementary education in Florida and who are in the pool of persons qualified to be hired as elementary school teachers.
- Data on the ethnicity of individuals were not available for the entire sample, because completion of this information is voluntary. Therefore, these data were not consistently available.
- The sum (N) of the total sample vary for each analysis as a result of missing data.
- Faculty of some colleges of education have indicated to the Commission that several of their preservice courses have computer education components which are not necessarily reflected in the course titles. As a result, only courses that could be identified as content computer courses were included in the data collected. This same limitation applies to other content courses.
- Transcripts of individuals, which were missing the lower and/or upper division studies, were excluded from the analysis. (An example is a credential file which has a transcript from the upper division coursework and only a statement of transfer for credit hours accepted for the lower division work; in other words, no transcript exists in the individual's file for the lower division work.)

Two samples of transcripts were analyzed. First, to observe trends in teacher preparation plus supply and demand data, an analysis was conducted on one sample of 873 transcripts for degrees awarded from 1946 - 1988 from both in-state and out-of-state institutions. Those who received a baccalaureate degree from out-of-state institutions in this sample numbered 433, while those who attended in-state institutions numbered 440.

It should be noted that more comprehensive analyses were conducted on those individuals who attended in-state institutions. For example, further analyses on mathematics, science, geography, and computer courses taken at the lower division of a four-year institution, community college, and upper division were conducted separately for those who attended in-state institutions. Similar data on mathematics, science, geography, and computer courses taken at the lower division of a four-year institution, community college, and upper division for individuals attending out-of-state institutions were grouped together and analyzed as such. It should be noted that further comparative analyses of out-of-state and in-state elementary education graduates will be conducted.

In order to record more recent preservice preparation trends of elementary teachers, a second sample was analyzed of 203 transcripts for degrees awarded from 1987 - June, 1989. The second sample included only transcripts from in-state institutions.

For purposes of this discussion, the sample of transcripts for degrees awarded from 1946-1988 will be referred to as the **first** sample, and the sample of transcripts from the period from 1987-1989 will be referred to as the **second** sample.

2: Demographics

The Commission observed the following demographic trends in the two samples:

Percentage of Males and Females

In the first sample of transcripts, males comprised 8.3% of the sample, compared to 91.6% females. For the second sample, the percentage of males dropped to 2.5% (see Table 6).

TABLE 6

Analysis of Randomly Selected Transcripts
of Persons Certified in Elementary Education in Florida
by Gender by Each Sample

	First Sample (1946-1988)	Second Sample (1987-1989)	Total Sample (1945-1989)
Numbers of Transcripts	873	203	1076
Percentage of Males	8.3%	2.5%	
Percentage of Females	91.6%	97.5%	

Percentage of Ethnic Groups

An analysis of ethnic groups was conducted on the first sample. Nearly 77% of these individuals indicated that they were white; 17.5% indicated that they were Black; and 5.8% of the sample indicated that they were Hispanic. The transcript records of the second sample did not consistently provide ethnic data, and therefore, were not analyzed.

Patterns of Attendance

Information relating to the number of students who attend a community college and numbers of students who attended the lower division of a four-year institution was analyzed. When comparing these data for each sample, it becomes evident that there has been a major shift as to where in-state students take their general education requirements. Table 7 shows that 5.1% of those in the first sample who received a degree from an out-of-state institution attended a community college. In the same sample, 43% of the persons who received a degree from an in-state institution attended a community college. In the second sample of the more recent in-state graduates, 65.5% attended a community college for their general education coursework.

TABLE 7

Analysis of Randomly Selected Transcripts
of Persons Certified in Elementary Education in Florida
by Attendance at Community Colleges and Lower Division of Four-Year Institutions
by Each Sample

	First Sample (1946-1988)		Second Sample (1987-1989)
	Out-of-State	In-State	In-State
Attended Community College	5.1%	43%	65.5%
Attended Lower Division of Four-Year Institution	94.9%	57%	34.5%

The second sample was surveyed for where in-state individuals received their degree. In this sample, 77.8% of degrees awarded were earned at one of the nine public state universities. Private institutions awarded 22.2% of the degrees in the second sample. Florida currently has 28 teacher training institutions. Tables 8 and 9 present the numbers of diplomas awarded per institution.

The data in Tables 8 and 9 do not reflect the TOTAL number of elementary education majors who graduated between 1987-1989 from both public and private teacher training institutions in Florida. Rather, the data represent the number of elementary graduates who applied for certification in Florida and were randomly selected in the sample for this study. Thus, these numbers do not represent the total number of graduates from any one institution during the years of the sample.

TABLE 8

Public Postsecondary Institutions Which Conferred Degrees
to Individuals in the Sample Who Graduated Between 1987-1989
and are in the Pool of Persons Certified in Elementary Education in Florida

INSTITUTION	N
Florida A & M University	2
Florida Atlantic University	14
Florida International University	11
Florida State University	28
University of Florida	11
University of Central Florida	32
University of North Florida	14
University of South Florida	32
University of West Florida	14
N = 158 77.8%	158

TABLE 9

Private Postsecondary Institutions Which Conferred Degrees
to Individuals in the Sample Who Graduated Between 1987-1989
and are in the Pool of Persons Certified in Elementary Education in Florida

INSTITUTION	N
Barry University	2
Bethune-Cookman College	4
Edward Waters College	2
Flagler College	6
Florida Memorial College	1
Florida Southern College	3
Nova University	8
Palm Beach Atlantic University	1
Rollins College	3
Saint Leo College	2
Southeastern College of the Assemblies of God	1
Stetson University	4
University of Miami	2
University of Tampa	1
Warner Southern College	5
N = 45 22.2%	45

Eckerd College, Florida Institute of Technology, Jacksonville University, and Saint Thomas University were not reflected in the randomly selected transcripts for this study.

3: Analysis of Transcripts, Sample of 203 Individuals

Section 3 of the transcript analysis presents information found in the sample of 203 individuals who graduated from in-state institutions between 1987-1989. The Commission focused extensive analysis on this sample of transcripts in order to review the most recent preparation trends of elementary teachers by in-state institutions in the areas of mathematics, science, computer education, and geography.

Part 4 of this section summarizes the findings from analyzing the sample of 873 transcripts dated 1946-1988. The Commission believes that the results of this information has implications for issues of certification renewal and inservice programs. The third part of the transcript analysis compares both samples to discuss trends.

In the random sample of 203 transcripts, the following observations should be noted regarding courses taken in mathematics, science, computer education, and geography at the community college.

Courses at the Community College

In the second sample, 65.5% attended a community college, and of that group who attended a community college:

- 97% took one or more mathematics courses;
- 79.7% took two or more mathematics courses;
- 42.1% took three or more mathematics courses; and
- 3.0% did not take any mathematics courses.

In the area of science, of the 65.5% who attended a community college:

- 96.2% took one or more science courses;
- 80.5% took two or more science courses;
- 48.1% took three or more science courses; and
- 3.8% did not take any science courses.

In the area of computer education, of the 65.5% who attended a community college:

- 30.8% took one or more computer courses;
- 6.0% took two or more computer courses; and
- 69.2% did not take any computer courses.

In the area of geography, of the 65.5% who attended a community college:

- 6.8% took one or more geography courses;
- .8% took two or more geography courses; and
- 93.2% did not take any geography courses.

Courses at the Lower Division of a Four-Year Institution

In the sample of 203 transcripts, 34.5% attended a four-year institution for their lower division (general) studies. Of <u>that</u> group:

- 84.3% took one or more mathematics courses;
- 61.4% took two or more mathematics courses;
- 14.3% took three or more mathematics course; and
- 15.7% did not take any mathematics courses.

In the area of science, of the 34.5% who attended the lower division at a four-year institution:

- 90% took one or more science courses;
- 61.4% took two or more science courses;
- 15.7% took three or more science courses; and
- 10% did not take any science courses.

In the area of computer education, of the 34.5% who attended the lower division of a four-year institution:

- 24.3% took one computer course;
- 2.9% took two computer courses; and
- 75.7% did not take any computer courses.

In the area of geography, of the 34.5% who attended the lower division of a four-year institution:

- 5.7% took one geography course; and
- 94.3% did not take any geography courses.

Table 10 presents a comparison of the percentage of randomly selected individuals in the certified pool of elementary education in Florida who took one or more courses in the identified subjects.

TABLE 10

Percentage of 203 Randomly Selected Individuals
Certified in Elementary Education in Florida
Attending Community Colleges and Lower Division of a Four-Year Institution
and
The Percentage of Those Groups Taking One, Two, and Three Courses
in Mathematics, Science, Computer Education, and Geography

	Community College	Lower Division of a Four-Year Institution
Percentage of Sample Attending	65.5%	34.5%

Percentage of Sample Taking Courses in
Mathematics, Science, Computer Education, and Geography
at the Community College and Lower Division of a Four-Year Institution

Mathematics		
1 or more courses	97.0%	84.3%
2 or more courses	79.7%	61.4%
3 or more courses	42.1%	14.3%
Science		
1 or more courses	96.2%	90.0%
2 or more courses	80.5%	61.4%
3 or more courses	48.1%	15.7%
Computer Education		
1 course	30.8%	21.4%
2 courses	6.0%	2.9%
Geography		
1 course	6.0%	5.7%

Upper Division Courses

The Commission also examined the numbers of upper division courses taken by the second sample of recent graduates.

Analysis of the 203 sample revealed that some students were taking upper level mathematics and science courses. For example, those who took these courses include:

- 7.4% of the sample took upper level mathematics courses;
- 6.9% of the sample took upper level science courses;
- 22.7% of the sample took upper level computer courses; and
- 2.5% of the sample took upper level geography.

The majority of the mathematics and science courses taken by the sample were taken at the lower level.

Both Lower and Upper Division Courses

An analysis of the percentage of students of the second sample taking mathematics and science courses at both the upper and lower levels of study shows that elementary teachers who recently graduated from in-state institutions are taking courses in mathematics and science. Specific observations relating to the percentage of students taking both mathematics and science lower and upper division courses are:

Mathematics

- 96.1% took one or more mathematics courses;
- 77.8% took two or more mathematics courses;
- 37.4% took three or more mathematics courses; and
- 3.9% did not take any mathematics courses.

Science

- 94.1% took one or more science courses;
- 77.3% took two or more science courses;
- 41.9% took three or more science courses; and
- 5.9% did not take any science courses.

Methods Courses in Mathematics, Science, Computer, and Social Science

Of the total sample of 203 transcripts, the following data were collected regarding the number of methods courses taken in mathematics, science, and social science:

Mathematics Methods

- 97% took one or more mathematics methods courses;
- 54.2% took two mathematics methods courses; and
- 3% did not take any mathematics methods courses.

Science Methods

- 92.6% took at least one science methods courses;
- 7.9% took two science methods courses; and
- 7.4% did not take any science methods courses.

Social Studies Methods

- 92.6% took one or more social science methods courses;
- 4.9% took two social science methods courses; and
- 7.4% did not take any social science methods courses.

From the data collected, it appears that most persons preparing to teach in the elementary schools do not take more than one methods course in science or social studies. Over one-half of the randomly selected transcripts of individuals in the second sample did take two mathematics methods courses.

4: Analysis of Transcripts of the Sample of Persons Attending In-State Institutions from 1946 - June, 1988

The Commission also examined a randomly selected sample of 440 of the 873 sample of transcripts, with graduation dates ranging from 1946 - 1988. These 440 graduated from in-state institutions, and therefore, a more indepth analysis was conducted. The Commission identified the following findings in regard to percentage of the sample taking content and methods courses in mathematics, science, computer education, and geography.

Courses at the Community College

In the first sample of 440 transcripts analyzed, 43% attended a community college for their lower division studies. Of these who attended a community college:

- 92.5% took one or more mathematics courses;
- 66% took two or more mathematics courses;
- 25.2% took three or more mathematics courses; and
- 7.5% did not take any mathematics courses.

In the area of science, of the 43% who attended a community college:

- 94.3% took one or more science courses;
- 88.7% took two or more science courses;
- 54% took three or more science courses; and
- 5.7% did not take any science courses.

In the area of computers, of the 43% who attended a community college:

- 3.1% who took at least one computer course; and
- 1.3% took four computer courses.

In the area of geography, of the 43% who attended a community college:

- 15.7% took at least one geography course;
- 1.9% took two geography courses; and
- 84.3% did not take any geography courses.

Courses at the Lower Division of a Four-Year Institution

In the sample of 440 transcripts, 57% attended a lower division of a four-year institution. The following observations were made about the sample:

- 88.4% took one or more mathematics courses;
- 54.5% took two or more mathematics courses;
- 16.7% took three or more mathematics courses; and
- 11.6% did not take any mathematics course

In the area of science, of those who attended a lower division of a four-year institution:

- 93.1% took one or more science courses;
- 81.5% took two or more science courses; and
- 39.1% took three or more science courses
- 6.9% did not take any science courses.

In the area of computer, of those who attended a lower division of a four-year institution:

- 1.7% took one or more computer courses; and
- .4% took two computer courses.

In the area of geography, of those who attended the lower division of a four-year institution:

- 39.9% took one or more geography courses;
- 9.9% took two or more geography courses; and
- 3.4% took three or more geography courses.

Upper Division Courses

The following are the mathematics, science, computer education, and geography courses taken at the upper division by 440 of the 873 sample who attended in-state universities:

Mathematics

- 11% took one or more mathematics courses;
- 4% took two or more mathematics courses; and
- 89.8% did not take any mathematics courses.

Science

- 8.6% took one or more science courses;
- 3.0% took two or more science courses; and
- 91.4% did not take any science courses.

Computer

- 5.6% took one or more computer courses;
- .6% took two or more computer courses; and
- 94.4% did not take any computer courses.

Geography

- 2.7% took one or more geography courses;
- 1.0% took two geography courses; and
- 97.3% did not take any geography courses.

Methods Courses in Mathematics, Science, and Social Science

The Commission also examined the sample of 440 in-state transcripts for the number of methods courses taken in mathematics, science, and social science. In the total sample, the following individuals took:

Mathematics Methods

- 78.7% took one or more mathematics methods courses;
- 17.6% took two mathematics methods courses; and
- 19.9% did not take any mathematics methods courses.

Science Methods

- 71.6% took one or more science methods courses;
- 8.8% took two science methods courses; and
- 25.7% did not take any science methods courses.

Social Science Methods

- 69.9% took one or more social science methods courses;
- 4.7% took two social science methods courses; and
- 30.1% did not take any social science methods courses.

TABLE 11

Comparative Analysis of Recent and Non-Recent Graduates in the Pool of Teachers Certified in Elementary Education in Florida

Recent In-State Graduates (203 Sample) (1987-1989)	Non-Recent In-State Graduates (440 of the 873 Sample) (1946-1988)
1. 65.5% of the sample earned an A.A./A.S. degree from a community college.	1. 43% of the sample earned an A.A./A.S. degree.
COURSES TAKEN AT A COMMUNITY COLLEGE	
2. 97% of those who attended a community college took at least one math course, and 79.7% took at least two math courses.	2. 92.5% of those who attended an in-state community college took at least one math course, and 66.0% took at least two math courses in a community college.
3. 96.2% of those who attended a community college took at least one science course, and 80.5% took at least two science courses.	3. 94.3% of those who attended an in-state community college took at least one science course, and 88.7% took at least two science courses.
4. 30.8% of those who attended a community college took at least one computer course.	4. 3.1% of those who attended an in-state community college took at least one computer course.
5. 6.8% of those who attended a community college took at least one geography course.	5. 15.7% of those who attended an in-state community college took at least one geography course.
COURSES TAKEN AT THE LOWER DIVISION OF A FOUR-YEAR INSTITUTION	
6. 84.3% of those who did their lower division studies in a four-year institution, took at least one math course, and 61.4% took at least two math courses.	6. 88.4% of those who attended an in-state lower division of a four-year institition, took at least one math course, and 54.5% took at least two math courses.
7. 90% of those who did their lower division studies in a four-year institution, took at least one science course, and 61.4% took at least two science courses.	7. 93.1% of those who attended an in-state lower division in a four-year institution, took at least one science course, and 81.5% took at least two science courses.
8. 24.3% of those who attended the lower division of a four-year institution took at least one computer course.	8. 1.7% of those who attended an in-state lower division in a four-year institution took at least one computer course.
9. 5.7% of those who attended the lower division of a four-year institution took at least one geography course.	9. 39.9% of those who attended an in-state lower division in a four-year institution took at least one geography course.

TABLE 11 (continued)

Comparative Analysis of Recent and Non-Recent Graduates in the Pool of Teachers Certified in Elementary Education in Florida

Recent In-State Graduates (203 Sample) (1988-1989)	Non-Recent In-State Graduates (440 of the 873 Sample) (1946-1988)
COURSES TAKEN AT THE UPPER DIVISION	
10. 10.3% of the sample took at least one math course at the upper division.	10. 11.0% of the sample took at least one math course at the upper division.
11. 11.3% of the sample took at least one science course at the upper division.	11. 8.6% of the sample took at least one science course at the upper division.
12. 22.7% of the sample took at least one computer course at the upper division.	12. 5.6% of the sample took at least one computert course at the upper division.
13. 2.5% of the sample took at least one geography course.	13. 2.7% of the sample took at least one geography course at the upper division.
METHODS COURSES	
14. 97% of the sample took at least one math methods course.	14. 87.0% of the 440 sample took at least one math methods course.
15. 92.6% of the sample took at least one science methods course.	15. 90.2% of the 440 sample took at least one science methods course.
16. 92.6% of the sample took at least one social science methods course.	16. 87.5% of the 440 sample took at least one social science methods course.

SUMMARY OF OBSERVATIONS

1. Of the 873 sample (non-recent graduates) 24.1% received an A.A./A.S. degree. Of these, 21.6% are from in-state community colleges, and 2.5% out-of-state. 65.5% of recent graduates (203 sample) attended a community college.

2. Of non-recent in-state graduates (440 sample) 57% attended a lower division of a four-year institution, while 34.5% of recent in-state graduates (203 sample) attended a lower division of a four-year institution. These observations showed that there is a change as to where in-state elementary education graduates received their lower division studies.

3. The percentage of male elementary education teachers continues to decline. Of non-recent graduates (873 sample), 8.3% were males, while 2.5% of recent graduates (203 sample) were males.

4. A high percentage of recent in-state graduates (203 sample) and non-recent in-state graduates (440 of 873 sample) who attended a community college and a lower division of a four-year institution took mathematics and science courses.

5. Recent in-state graduates (203 sample) who attended a community college and lower division of a four-year institution took the least number of courses with geography in the title, while in-state non-recent graduates (440 of 873 sample) took the least number of courses in computer.

6. Observations at the community college and lower division of a four-year institution showed that recent in-state elementary graduates and non-recent in-state elementary graduates are taking most of their mathematics and science courses at the lower division.

7. Recent in-state graduates (203 sample) and non-recent in-state elementary graduates (440 of 873 sample) took few mathematics, science, computer, and geography courses at the upper level. Recent graduates, however, took a significantly higher percentage of computer courses (22.7%), compared to other three courses at the upper level.

REVIEW OF PRESERVICE ELEMENTARY EDUCATION PROGRAM REQUIREMENTS

REQUIREMENTS FOR GRADUATION FROM A PRESERVICE PREPARATION PROGRAM IN ELEMENTARY EDUCATION IN FLORIDA

For the third phase of its study on the preservice preparation of elementary school teachers in Florida, the Education Standards Commission reviewed the current catalogs of all public and private colleges and universities which offer state-approved programs in elementary education. General education requirements and requirements specific to elementary preservice programs were examined. Course code numbers and names of content courses in mathematics, science, and computer education with the number of credit hours were recorded for each preservice program as well as general education requirements. In addition, program requirements in methods courses specifically for mathematics and science were identified.

The transcript analysis phase of the preservice study revealed that a growing number of elementary education students (approximately 65.5%) transfer from the community colleges with A.A. degrees to the upper division of four year institutions to complete their preservice programs in elementary education. Therefore, the Commission decided to examine the catalogs of seven selected community colleges which are located near public universities. General education requirements and offerings in mathematics, science, and computer education were noted. Since the principal surveys had revealed principals' concern over content knowledge and use of hands-on "manipulatives" in science of their newly graduated teachers, the science laboratory requirements and offerings were also examined.

Telephone interviews with faculty members and advisors were conducted to verify catalog information relevant to elementary education requirements in the college and university programs (see Reference Notes 3-26). Science faculty and advisors were interviewed by telephone at community colleges especially in regard to science laboratory offerings, requirements and facilities (see Reference Notes 27-29).

The following observations of the preservice programs, requirements and course offerings are offered in three sections: mathematics, science, and computer content courses at the public and private institutions, followed by the methods courses, and, third, the analyses of community college requirements at the seven selected institutions

Analysis of Catalogs for Requirements for Graduation From Education Preservice Programs in Florida's Public Universities

The catalogs for the nine public universities in Florida were examined for graduation requirements from elementary education preservice programs. The nine state universities, in alphabetical order, are: Florida Agricultural and Mechanical University, Florida Atlantic University, Florida International University, Florida State University, University of Central Florida, University of Florida, University of North Florida, University of South Florida, and the University of West Florida.

Mathematics

Each of the nine public universities require a minimum of six (6) hours of **mathematics**. This corresponds to a requirement in Florida Administrative Code 6A-10.030, known as the "Gordon Rule", that all students take a minimum of six hours at the college algebra level and higher (see Appendix B). However, four universities require more than the minimum six hours. They are the University of Florida which requires nine (9) hours of mathematics, the University of West Florida and Florida State University which require ten (10) hours of mathematics, and the University of Central Florida which requires twelve (12) hours of mathematics. The additional hours beyond the six hours required (for general education) are required by the elementary education program (see Table 12 for specific information).

Science

In **science**, the public universities require a minimum between six (6) hours (Florida International University and the University of South Florida) and twelve (12) hours (Florida State University) of science courses. Florida Atlantic University requires seven (7) hours of science, Florida A & M University and the University of North Florida require eight (8) hours, the University of Florida requires nine (9) hours of science, the University of Central Florida and the University of West Florida require ten (10) hours of science (see Table 12 for specific information).

Florida A & M University, the University of Central Florida, the University of North Florida, and the University of South Florida offer four (4) and three (3) hour credit courses for the non-science majors which are the combined lecture/laboratory format.

All of the nine public institutions offer science courses with laboratory components at the lower level for non-science majors as indicated by the catalogs surveyed.

The Florida International University, Florida State University, the University of Florida, the University of Central Florida and the University of West Florida offer courses which are three hour credit lecture and one credit hour laboratory in biological and/or physical sciences.

Computer Technology

In **computer technology** course requirements, two universities do not require computer courses in their preservice programs. They are Florida State University, and the University of North Florida. However, these programs include components relating to computers and technology in their professional preparation courses. At each university where a computer course is required, it is a requirement of the college of education.

TABLE 12

Graduation Requirements at the Nine Florida Public Universities in Total Hours and in Credit Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
Florida A & M 1988-90 catalog	127	6 credit hours	8 credit hours	3 * credit hours	* EME 4400 is a College of Education requirement.
Florida Atlantic University 1988-89 catalog	136	6 credit hours	7 * credit hours	3 ** credit hours	* Requires one-hour lab with physical science course. ** EME 4402 Educational Technology is a College of Education requirement.
Florida International University 1989-90 catalog	120-134 *	6 credit hours	6 credit hours	3 ** credit hours	* Completion requirements for community college transfer can add up to 134 hours. ** EME 3402 Computer Awareness/Computer Applications is a College of Education requirement.
Florida State University 1988-89 catalog	120	10 * credit hours	12 credit hours	**	* Four of the 10 hours are required by the elementary education program. MAE 4326, How Children Learn Math, is taught in the Department of Math Education in the College of Education and considered to be content. ** Although FSU does NOT require a course in computers, the core elementary courses have computer components.
University of Florida * 1989-90 catalog	161	9 ** credit hours	9 credit hours	3 *** credit hours	* UF has a 5-year program. The 161 hours represents a Master's degree. ** Requires in addition to math general education requirements, MAE 3811, a 3-hour course, Math for Elementary Teachers, taught by faculty in the Math Department, in the College of Arts and Sciences. May be waived if a student has completed with a grade of B or better in 2 advanced courses (6 hours) in algebra, geometry, or calculus. *** EME 3402, Introduction to Instructional Computing, is a 2-hour computer course which has an additional 1-hour lab and is a College of Education requirement.

(1) Information was collected from recent college catalogs and telephone interviews (Reference Notes 3-11).

TABLE 12 (continued)

Graduation Requirements at the Nine Florida Public Universities in Total Hours and in Credit Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
University of Central Florida 1988-89 catalog	120	12 * credit hours	10 ** credit hours	3 *** credit hours	* Six hours are general education requirements; six hours are MAE 1810 and 2811 (3 hours each), Math for Elementary Teachers, required for all elementary education majors and taught in the College of Arts and Sciences. MAE 3112 (4 hrs), Instructing Math in Elementary Schools, is required of all community college transfers and is taught in the College of Education. ** General education requirements in science are 7 hours. All elementary education majors must take these three courses, which add up to 10 hours: Basic Biology (4 hrs), Physics for Teachers (3 hrs), taught in the College of Arts and Sciences, and include a lab component, and Physical Geography, (3 hrs) taught in the College of Engineering. *** College of Education requires EDF 4285, Applications of Technology in Education, of all education majors.
University of North Florida 1987-88 catalog	120-128	6 * credit hours	8 credit hours	**	* Community college transfer students are required to take MAE 3810 (4 hours), Mathematical Structures, in addition to the six hours required in general education. Students completing general education requirements at UNF may use MAE 3810 to complete general education requirements. It is taught in the College of Arts and Sciences. ** Computer components are integrated into the education core curriculum.
University of South Florida 1988-89 catalog	120-135 *	6 credit hours	6 credit hours	2 ** credit hours or demonstrated competency in computers	* Completion requirements for community college transfers can total up to 135 credit hours. ** EME 4402, Introduction to Computers, is required by the College of Education.

(1) Information was collected from recent college catalogs and telephone interviews (see Reference Notes 3-11).

TABLE 12 (continued)

Graduation Requirements at the Nine Florida Public Universities in Total Hours and in Credit Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
University of West Florida 1989-90 catalog	120 minimum	10 * credit hours	10 ** credit hours	3 *** credit hours	* Requirements include 6 hours of college algebra or higher, plus a 4-hour course, MAE 3810, Math for the Elementary Teacher. This is taught by a math professor in the College of Arts and Sciences, and required by the elementary education programs. ** Seven hours of general education requirements in science. SCE 3800, Science for Elementary Majors (3 hours), is taught in the College of Education and is considered to be a content course. *** EME 4402, Microcomputers in Education, is required by the College of Education.

(1) Information was collected from recent college catalogs and telephone interviews (see Reference Notes 3-11).

Analysis of Catalogs for Graduation Requirements from Elementary Education Preservice Programs in Florida's Private Colleges and Universities

The Commission examined the catalogs of nineteen (19) preservice programs in private institutions for requirements in mathematics, science, and computer education. At the time of the study, these institutions had state approved preservice programs in elementary education. Alphabetically, the catalogs reviewed include: Barry University, Bethune-Cookman College, Eckerd College, Edward Waters College, Flagler College, Florida Institute of Technology, Florida Memorial College, Florida Southern College, Jacksonville University, Nova University, Palm Beach Atlantic College, Rollins College, Saint Leo College, Saint Thomas University, Southeastern College of the Assemblies of God, Stetson University, University of Miami, the University of Tampa, and Warner Southern College. Telephone interviews were conducted with faculty members and staff to verify information (see Reference Notes 12-26).

Mathematics

In **mathematics** content courses, the requirements vary from one (1) mathematics course to three (3) courses or 3-9 credit hours. A sample of the private institutions reveal that Flagler College requires nine hours, and Palm Beach Atlantic College requires three (3) hours of mathematics for the B.A. degree; six (6) hours for the B.S. degree, and an additional nine hours of mathematics or science for the B.S. degree (Palm Beach Atlantic offers the B.A. and B.S. degrees in elementary education). St. Leo College requires one 3-hour course in mathematics and an additional three (3) hours of mathematics **or**

science. The University of Tampa requires eight (8) hours, 4 hours of which are general education requirements (Algebra) and 4 hours is a requirement for elementary education requirements (see Table 13 for specific information).

Science

The catalogs indicated that the **science** requirements are either one (1) or two (2) science courses, or three (3) to six (6) hours of science. St. Thomas University, Saint Leo College, Southeastern College of the Assemblies of God, and Eckerd College require one science course. The following institutions require at least one science course **with** a laboratory component: the University of Tampa, Edward Waters College, Warner Southern College, the University of Miami, Bethune-Cookman, and Jacksonville University. Florida Southern College's catalog lists its science requirement as four (4) credit hours. Other private institutions appear to require two science courses (see Table 13 for specific information).

Palm Beach Atlantic College requires an additional nine (9) hours of science and mathematics for the B.S. degree. The University of Miami requires a College of Arts and Sciences degree with elementary education as a minor. The science requirements are different for a B.A. or B.S. degree; the minimum science requirements are 4 to 8 hours for a B.S. and 11 to 12 for a B.A..

The Commission studied the catalogs of five selected private institutions to identify science laboratory offerings. These five institutions included Bethune-Cookman College, Flagler College, Nova University, Stetson University and the University of Miami. These five were selected because they have the largest number of graduates represented from private institutions in the random sampling in the transcript analysis.

Science requirements of these five institutions range from six to twelve hours. Stetson and the University of Miami offer four hour credit lecture/ laboratory blocks for non-science majors. Miami also offers three hour courses without a separate laboratory component in physical sciences. The University of Miami requires every student to take at least one course with a laboratory component. Nova University and Bethune-Cookman offer three hour science courses. Bethune-Cookman offers a biology laboratory with a general biology course for non-science majors. Flagler College offers introductory biological science courses and laboratory classes but also offers "non-laboratory courses for non-majors".

Computer Technology

In **computer technology**, seven of the nineteen institutions require one computer course. These include Barry University, Nova University, Southeastern College of the Assemblies of God, Florida Southern College, Jacksonville University for the B.S. degree, Stetson University for the B.S. degree, and Flagler College. The course at Stetson is one credit hour. One private university requires two computer courses (the University of Tampa). Nine private institutions do not require any computer courses: Bethune-Cookman College, Florida Memorial College, Rollins College, St. Leo College, University of Miami, Palm Beach Atlantic College, Edward Waters College, Warner Southern College and Eckerd College. Of the nine private institutions which do not require computer courses, Eckerd College, Bethune-Cookman College, and Warner Southern College include a computer component in each of the professional preparation courses in their preservice programs, and at St. Leo College, all methods courses have computer components (see Table 13 for specific information).

TABLE 13

Graduation Requirements at the Florida Private Colleges and Universities in Total Hours and in Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
Barry University 1988-89 catalog	120-124	6 credit hours	6 credit hours	3 * credit hours	* CED 410, Operating Microcomputers in the Classroom, is required and taught in the School of Computer Science. Has one required geography course.
Bethune-Cookman College 1988-89 catalog	124-129	6 credit hours	8 credit hours	*	* Core elementary education courses have computer components.
Eckerd College 1988-89 course atlas	30-32 * courses	1 math course	1 course Biology or Physical Science	**	* Programs are listed in courses; normal progress is four courses a term for eight terms. ** Every professional education course has a computer component.
Edward Waters College 1988-89 catalog	120-130	9 * credit hours	7 ** credit hours		* Mathematics requirements include 3 hours each of Math 101 (General Math I) and Math 102 (General Math II) plus Math 104 (College Algebra). ** Includes Biology 101 (3 hours) and Physical Science 201 (4 hrs) which has Math 104 as a prerequisite.
Flagler * College 1988-89 catalog	120-127	9 ** credit hours	6 credit hours	3 *** credit hours	* Does not have a general elementary education program. Its elementary program is combined with five areas; there are three dual certification areas: (1) Elementary/Hearing Impaired; (2) Elementary/Mental Retardation; and (3) Elementary/Specific Learning Disabilities. The two other areas are: (4) Exceptional Child Component; and (5) Spanish Speaking. ** Requires 6 hours of general education and 3 hrs of EDU 203, Testing and Development, and is taught in the College of Education and required of all education majors. *** EDU 324, Instructional Design (3 hrs) is taught in the College of Education and is required of all education majors.

(1) Information was collected from recent college catalogs and telephone interviews (see Reference Notes 12-26).

TABLE 13 (continued)

Graduation Requirements at the Florida Private Colleges and Universities in Total Hours and in Credit Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
Florida Institute of Technology 1988-89 catalog	*				* Has a science education program with concentrations in Biology, Science, Computers, Earth/Space Science, General Science, Mathematics, or Physics.
Florida Memorial College 1985-87 catalog	124	6 credit hours	6 credit hours		
Florida Southern College 1988-89 catalog	124	6 credit hours	8 credit hours	3 * credit hours	* Requires EDU 300, Microcomputers in Education, K-12.
Jackson-ville University 1988-89 catalog	128	6 credit hours	7 * credit hours	1 ** course	* One course must have a lab component. ** To fulfill B.S. degree requirements; students can earn either a B.A. or B.S. degree in elementary education. Taught in the Division of Mathematics.
Nova * University 1988-89 catalog	120	6 credit hours	6 credit hours	3 ** credit hours	* Requires 21 hours of electives in math, science, and social sciences during four years of preparation, and could be used as general education requirements. ** CS 111, Computer Literacy (3 hours), taught in the College of Arts & Sciences for education majors.
Palm Beach Atlantic College	128	B.S. 6 * B.A. 3 * credit hours	B.S. 8 * B.A. 8 * credit hours		* Requires an additional 9 hours between mathematics and science courses for a B.S. degree.
Rollins College 1988-89 catalog	35 * courses	3 credit hours	2 ** courses		* Academic credit is awarded in terms of "course units", a standard course to be defined as 9-12 hours per week of student academic time. ** One course must have a lab section.

(1) Information was collected from recent college catalogs and telephone interviews (see Reference Notes 12-26).

TABLE 13 (continued)
Graduation Requirements at the Florida Private Colleges and Universities in Total Hours and in Credit Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
Saint Leo College 1988-89 catalog	126	3 * credit hours	3 * credit hours	**	* Requires 3 additional hours in either mathematics or science. ** Students are encouraged to gain a knowledge of computers. All methods All methods courses have computer components. EDU 228, Microcomputers in the Elementary School, is an elective for elementary majors.
St. Thomas University 1987-89 catalog	120	3 credit hours	3 credit hours	3 * credit hours	* Recommends CIS 100, Computer Literacy, or CIS 205, Microcomputers Applications.
Southeast-ern College of the Assemblies of God 1988-90 catalog	130	3 * credit hours	3 * credit hours	3 ** credit hours	* Requires 6 hours of additional electives in mathematics and science. ** Requires EDU 3003, Computers for K-12 Teachers.
Stetson University 1988-89 catalog	128	4 * 5 ** credit hours	8 ** credit hours	1 * credit hour	* Required for B.S. degree. ** Required for B.A. degree. Stetson offers both B.S. and B.A. degree programs in elementary education.
University of Miami *	120	3-6 ** 11-12 *** credit hours	11-12 ** 4-8 *** credit hours		* Requires a major area in the College of Arts and Sciences, and a minor in elementary education. ** Requires for B.A. degree. *** Requires for B.S. degree. University of Miami offers both B.A. and B.S. degrees in elementary education.
University of Tampa 1988-89 catalog	124	8 * credit hours	6 ** credit hours	5 *** credit hours	* MAT 160, College Algebra (4 hrs), is a general education requirement. MAT 104, Modern Elementary Mathematics (4 hrs), is required for only elementary majors and taught in the College of Arts & Sciences. ** One course must have a lab component. *** CSC 200, Introduction to Computers (3 hrs) is a general education requirement, and taught in the College of Business. EDU 319, Microcomputers in Education (2 hrs) is required of elementary education majors, and is taught in the College of Education.

(1) Information was collected from recent college catalogs and telephone interviews (see Reference Notes 12-26).

TABLE 13 (continued)

Graduation Requirements at the Florida Private Colleges and Universities in Total Hours and in Credit Hours in the Areas of Mathematics, Science, and Computer Education for Preservice Preparation Programs in Elementary Education (1)

Institution	Total number of hours	Mathematics	Science	Computer	Comments
Warner Southern College 1986-88 catalog	128	3 credit hours	8 * credit hours	**	* 2-hour laboratory sessions are included with 3-hour lectures for 4 hour credit courses. ** Computer component is included in EDF 202, Principles of Education (2 hrs), is required of all education majors.

(1) Information was collected from recent college catalogs and telephone interviews (see Reference Notes 12-26).

Analysis of Catalogs for Requirements in Methods Courses in Elementary Education at Public and Private Institutions in Florida

Each of the public universities require at least one three (3) hour methods course in each area of mathematics, science, and social sciences except Florida International University which does not require a methods course in the social sciences.

Eighteen private institutions also require at least one methods course each in mathematics, science, and social sciences, except Florida Southern College and Warner Southern College, which offer a combined science and social science methods course.

Analysis of Catalogs for General Education Requirements in Seven Florida Public Community Colleges

The Education Standards Commission reviewed current catalogs of seven community colleges in Florida to determine General Education and A.A. degree requirements. The seven colleges reviewed include: Hillsborough Community College, Miami-Dade Community College, Polk Community College, Santa Fe Community College, Seminole Community College, Tallahassee Community College, and Valencia Community College. Telephone interviews were conducted with faculty members to verify information (see Reference Notes 27-29).

General Education requirements at these community colleges vary from 36 to 45 credit hours; requirements for the A. A. degree range from 60 to 64 hours. In mathematics, all of these six community colleges require six hours of mathematics which is consistent with the requirements stipulated in the "Gordon Rule" (FAC 6A-10.030) (see Appendix B). Requirements in science vary from six to nine hours. Tallahassee Community College and Valencia Community

College each require six hours; Santa Fe Community College, Hillsborough Community College, and Polk Community College require eight hours; and Seminole Community College requires nine hours.

When the Commission reviewed the community college catalogs, it was noticed that all of the colleges encourage students to "sample" the science offerings. The prevalent recommendation printed in the catalogs is to take courses from both the biological and physical sciences. Perusal of the science offerings indicated that the community colleges most commonly offer three hour credit lecture courses with or without a "co-requisite" one hour credit laboratory class or offer a four hour credit course which combines lecture and laboratory experiences into one course offering. Hillsborough, Polk, and Tallahassee community colleges offer the four hour courses. All of the Hillsborough offerings at the introductory level include a co-requisite laboratory. Polk, Seminole, Tallahassee and Valencia community colleges offer three hour courses with co-requisite laboratory class and four hour credit courses which include the laboratory. Seminole and Miami-Dade also offer courses with "recommended laboratory".

TABLE 14

Number of Credit Hours or Courses Required
at Seven Florida Community Colleges for General Education,
A.A. Degrees, and General Education Requirements
in the Areas of Mathematics, Science, and Computer Technology

Institution	General Ed. Credit Hours	A.A. Degree Credit Hours	Math Credit Hours	Science Credit Hours	Computer Technology Credit Hours
Hillsborough	39	62	6	8	
Miami-Dade *	36	62	2 courses	2 courses	
Polk **	41		6	8	
Santa Fe ***	45	64	6	8	
Seminole	43	64	6	9	
Tallahassee	39	62	6	6	
Valencia	36	60	6	6	

* - A.A. degree requirements are in number of courses. Most of the course offerings are 3 credit hours; a few are 4 credit hours (see Reference Note 27).
** = See Reference Note 28.
*** - See Reference Note 29.

General Observations

The following general observations can be made about requirements in mathematics, science, and computer technology in the elementary education preservice programs in public and private universities and the general education/A.A. requirements in the seven community college catalogs reviewed.

* 65.5% of the sample of recent graduates (1987-1989) of elementary education certificated individuals transferred to the upper division of a four-year institution after attending a community college for the first two years of general education requirements.

* Most private institutions, all public four-year institutions, and all community colleges reviewed require a minimum of six (6) credit hours in mathematics.

* All private institutions, all public four-year institutions, and the community colleges reviewed require a minimum of three (3) credit hours in science; most require more.

* There is a wide variety of requirements in the four-year institutions for computer science and computer education. These range from no requirements to specific courses to exposure to computer uses for the classroom as a component in professional preparation and methods classes.

RECOMMENDATIONS WITH RATIONALE

RECOMMENDATION 1

THE LEVEL FOR INITIAL CERTIFICATION IN ELEMENTARY EDUCATION SHOULD BE K-6. *

The Education Standards Commission is recommending a K-6 initial certification level so that prospective elementary teachers will have the necessary competencies to work effectively with students at their appropriate developmental ages and stages. Therefore, the Commission strongly advocates that the clinical phases of preparation must include experiences with children who represent the full range of developmental stages.

* The Commission will be considering recommendations addressing preschool and primary certification levels.

RATIONALE: The Education Standards Commission has reconsidered its initial recommendation that the elementary certification level be grades 3-6, and is recommending that initial certification at the elementary level cover grades K-6. This departure in the Commission's original thinking has been the result of testimony received at five public hearings as well as discussions about the continuous progress concept in elementary schools.

The Education Standards Commission continues to advocate that teachers provide developmentally appropriate activities to all children in elementary schools. In order to do this, every elementary teacher needs to understand the developmental stages of children. As one Florida elementary principal stated,

> *"All elementary education teachers should be trained to feel comfortable using preoperational, concrete operations, and formal operations stages within their classrooms as needed to address the preventative, developmental, and enrichment needs of the students that they serve."*
>
> *Smith, February, 1990*
> *(see Reference Note 1)*

Children do not neatly fall into rigidly defined blocks of any one developmental stage. The part-time exceptional education student, the struggling student who does not qualify for exceptional education programs because he/she does not meet the guidelines, the gifted child, the talented child, and the average child exist at all grade levels. Schools are now experiencing even more evidence of the lack of clearly visible developmental stages as the children of diverse cultures, poverty, changing families; and victims of substance abuse, child abuse, and other social ills enter the school system. Grade delineations around developmental stages are becoming cloudy. It is becoming more imperative that training in preservice elementary education programs provide the breadth and scope of understanding the total child: where the child has been to where he is going.

Additionally, the Commission studied the issue of retention. As the State of Florida considers the economic and emotional effects of retention, the concept of continuous progress is receiving attention as a positive alternative. Given that the children entering elementary schools have a multitude of needs, and many carry these needs throughout their progress in the school, it is important that the teachers are prepared to instruct all children in the elementary grades. The need for teachers to be able to instruct all elementary children is highlighted by the fact that much of the testimony received indicated that flexibility in staffing is important to both administrators and teachers. Therefore, the Education Standards Commission believes it is prudent and practical to train prospective teachers in content knowledge and skills for the full range of elementary grades and the children they will be teaching.

RECOMMENDATION 2

INITIAL CERTIFICATION OF ELEMENTARY TEACHERS IN FLORIDA AND FROM OTHER STATES FOR GRADES K-6 SHOULD BE GRANTED ON THE BASIS OF GRADUATION FROM A STATE-APPROVED ELEMENTARY EDUCATION PROGRAM.

RECOMMENDATION 3

THE FOLLOWING PRESERVICE ELEMENTARY PROGRAM GUIDELINES AND INDICATORS SHOULD SERVE AS THE CRITERIA FOR STATE APPROVAL OF ELEMENTARY TEACHER EDUCATION PROGRAMS FOR TEACHERS PREPARING TO WORK WITH CHILDREN IN GRADES K-6.

RATIONALE: In order to better prepare elementary teachers, the Education Standards Commission is recommending a different approach from that which has been the practice to date for preparing prospective elementary teachers, and also, for preservice program approval and initial certification.

Typically, initial certification in elementary education has been based on numbers of courses and hours taken in pedagogy in appropriate areas. The Commission believes that a departure from this current system and philosophy is essential if all children are to be more effectively served. The Commission's recommendations are stated as guidelines and indicators for approving programs in elementary education. The Commission believes these guidelines and indicators will facilitate prospective elementary teachers acquiring competencies needed in the classroom.

Thus, the Commission is recommending that initial certification for elementary teachers in Florida be based on graduation from a state-approved program in elementary education rather than on numbers of courses and hours.

The recommended guidelines for program approval in elementary education are organized into four clusters which include: **(a) Content; (b) Professional Preparation; (c) Methods; and (d) Clinical Education**. Each cluster includes an introductory statement and guidelines, with more specific statements which serve as indicators that a guideline is present in a particular elementary education program.

These guidelines do not prescribe one organizational model. The program approval guidelines are intended to reflect minimum competencies that beginning teachers should posses for initial certification.

> *These guidelines and indicators should not be construed as specific courses, but rather, components that should be included in the designing of an elementary education program.*

The proposed guidelines reflect many of the recommendations contained in the American Association of Colleges for Teacher Education (AACTE) and the National Council for Accreditation of Teacher Education (NCATE) recommendations for the preparation of elementary teachers.

CLUSTER I - CONTENT

> *The preparation programs for prospective elementary teachers should present knowledge (or content), not as a static collection of facts, but as an integrated process that will enable elementary teachers to transform such knowledge into solving problems and explaining phenomena.*

It has been proposed that mathematics and science courses should be revamped and that prospective teachers be given opportunities to construct knowledge in contexts that are similar to those in which they will have to re-present knowledge when they teach (Tobin, 1989 [see Reference Note 2]).

Mathematics, science, and other areas of content should not be learned as a body of unchanging facts and algorithms, but as a process of constructing knowledge to solve problems and explain phenomena (Tobin, 1989 [see Reference Note 2]). It has been argued that the mass lecture activities which are fairly typical of lower level courses should be replaced by small group and laboratory activities. The focus of learning should be on understanding the principles underlying the content. In addition, prospective elementary teachers should be able to integrate knowledge across fields, i.e., in an interdisciplinary approach.

The courses needed may not exist on campuses today. The courses needed must be courses taught by professors of content areas who are also knowledgeable about content for elementary-age students. A content course as described above might be co-taught with a science educator or a school district science coordinator or teacher. ***It should also be noted that what may be needed is a restructuring of the existing courses.***

Traditionally, content preparation for the prospective elementary teacher has been subsumed in the general education program. Indeed, this was verified in the Commission's analysis of transcripts and review of preservice requirements for general education and elementary programs. It is clear that recent graduates of elementary education programs have courses in the areas of mathematics and science. It is also evident that most of these courses are taken at the lower level. The Commission believes that a prospective elementary teacher must not only possess knowledge, but be able to explain, evaluate, argue, and reconstruct this knowledge in order to help children understand concepts. Furthermore, this corresponds with the analysis of surveys received from the elementary principals. Although responding principals believed teachers had skills and knowledge in mathematics, for example, it was not clear if they perceived the proficiency of the teachers as adequate for helping students move to problem solving. Therefore, the Commission believes that content taken to prepare prospective elementary teachers should go beyond general education coursework. This preparation should entail in-depth study in more than one field beyond the introductory coursework required of every college student.

GUIDELINE 1

AS A MINIMUM, THE PROGRAMS DESIGNED TO PREPARE PROSPECTIVE ELEMENTARY TEACHERS SHOULD INCLUDE SPECIALTY AREA STUDY OF SUBJECTS TAUGHT IN THE ELEMENTARY SCHOOL, FOR EXAMPLE, AESTHETICS AND HUMANITIES, BEHAVIORAL AND NATURAL SCIENCES, COMMUNICATIVE ARTS, MATHEMATICS, AND SOCIAL SCIENCE.

SUCH STUDY SHOULD PROVIDE SUFFICIENT DEPTH AND BREADTH OF KNOWLEDGE INCLUDING SOME COURSEWORK BEYOND THE INTRODUCTORY LEVEL SO THAT PROSPECTIVE TEACHERS HAVE COMMAND OF THE SUBJECT AT A LEVEL NECESSARY FOR QUALITY CLASSROOM INSTRUCTION.

PROGRAMS SHOULD HELP PROSPECTIVE ELEMENTARY TEACHERS DEVELOP SKILLS IN TRANSFORMING KNOWLEDGE FROM THE CONTENT DISCIPLINES INTO PEDAGOGICAL KNOWLEDGE BY INCORPORATING A MAJOR PROPORTION OF COURSEWORK THAT INCLUDES THE NATURE OF KNOWLEDGE, THE STRUCTURE OF DISCIPLINES AND RELATIONSHIPS AMONG THEM, AND THE PROCESSES OF INQUIRY AND RESEARCH.

THESE PROGRAMS SHOULD ALSO DEVELOP UNDERSTANDING OF THE STRUCTURE OF KNOWLEDGE IN AN ACADEMIC DISCIPLINE BY REQUIRING STUDY IN MORE THAN ONE FIELD BEYOND THE INTRODUCTORY LEVEL. PROGRAMS SHOULD ALSO PROVIDE STUDY IN THESE AREAS THAT IS STRUCTURED FROM AN INTERDISCIPLINARY PERSPECTIVE. BECAUSE WE TEACH AS WE LEARN, INSTRUCTION WITHIN THE UNIVERSITY CLASSROOM AND IN CLINICAL EXPERIENCES SHOULD MODEL THE INTEGRATION OF DISCIPLINES.

Indicators

1a. Programs should provide study and experience in the area of language arts, focusing upon language development, composing and analyzing language, reading, writing, and literature, and nonprint and instructional media.

1b. Programs should provide study and experience in the area of mathematics, focusing upon the real number system: whole numbers, integers, rational numbers; rounding and estimating numbers; measurement; geometry; similarity and congruence; probability, statistics, and logic; problems involving ratio, proportion, and percent; coordinate geometry; and algebra. (Florida Council of Teachers of Mathematics)

1c. Programs should provide study and experience in the area of reading, focusing upon the language foundation for reading, including the English communication system; linguistics, psychology of language and cognition; comprehension; word analysis; and appreciation and enjoyment of reading.

1d. Programs should provide study and experience in the area of science, focusing on laboratory and field-oriented experiences in the biological, physical, earth sciences, and health fields, including content and processes. Such programs should enable the prospective elementary teacher to explain phenomena.

1e. Programs should provide study and experience in the area of social studies, focusing upon developing and understanding of the information, concepts, theories, analytical approaches, and value perspectives in such areas as geography, history, economics, government, political science, anthropology, sociology, and social psychology.

1f. Programs should provide study and experience in the area of instructional and administrative applications of educational technology. Such programs should enable the prospective elementary teacher to select, apply, and integrate computers and other technologies to all areas of the curriculum.

1g. Programs should provide study and experience in the area of the creative and expressive arts.

CLUSTER II - PROFESSIONAL PREPARATION

Elementary teachers must care about children and believe that all children can learn. Their professional preparation should enable prospective elementary teachers to develop skills to transform knowledge in mathematics, science, social studies, technology, expressive arts, and language arts into activities which meet the learning needs and capacities of all children. Such preparation should also familiarize them with current research findings regarding teaching/learning processes and effective elementary schools. They should be encouraged to utilize these research findings in their everyday classroom instruction. Prospective elementary teachers should also be prepared to become lifelong learners to continually increase their personal and professional development.

GUIDELINE 2

PRESERVICE PROGRAMS SHOULD PROVIDE PROSPECTIVE ELEMENTARY TEACHERS WITH STUDY AND EXPERIENCES THAT PROMOTE AN UNDERSTANDING OF THE ROLE OF THE TEACHER IN TERMS OF THE SOCIAL, ECONOMIC, CULTURAL, AND POLITICAL INFLUENCES ON THE LIVES OF CHILDREN AND THEIR FAMILIES, THE ORGANIZATIONAL STRUCTURE OF SCHOOLS, AND THE SOCIOPOLITICAL, TECHNOLOGICAL, AND ECONOMIC PROCESSES THAT INFLUENCE EDUCATIONAL PROGRAMS.

Indicators

2a. Programs should include coursework and field experiences that reveal how the dynamics of influence and change occur in shaping the role of teachers in schools.

2b. Programs should provide for prospective elementary teachers to create case studies, engage in direct inquiry, participate in various forms of simulation studies, and/or participate with collaborating higher education and elementary school faculties in defining the role of teachers and examining alternate patterns of elementary school organization.

GUIDELINE 3

PRESERVICE PROGRAMS SHOULD PREPARE THE PROSPECTIVE ELEMENTARY TEACHER TO UNDERSTAND THE UNIQUE LEARNING CHARACTERISTICS OF ELEMENTARY-AGE CHILDREN, INCLUDING THOSE FROM DIVERSE CULTURAL BACKGROUNDS, AND THE RELATION OF SUCH LEARNING CHARACTERISTICS TO THE DEVELOPMENT OF APPROPRIATE CURRICULUM AND INSTRUCTIONAL PRACTICE.

Indicators

3a. Programs should prepare prospective elementary teachers to assess a variety of learning needs.

3b. Programs should prepare opportunities for prospective elementary teachers to plan sequential activities for elementary school children of varied ages and cultural backgrounds.

GUIDELINE 4

PROGRAMS SHOULD INCLUDE STUDY AND EXPERIENCES LINKING CHILD DEVELOPMENT OF ALL CHILDREN TO ELEMENTARY SCHOOL CURRICULUM AND INSTRUCTION.

Indicators

4a. Programs should include some of the following direct ways of studying children's development: direct, guided observation; focused inquiry through data collection and systematic analysis; and self-study of interaction with children.

4b. Program activities devoted to child study should take place throughout the professional studies sequence.

4c. Programs should prepare prospective elementary teachers to select methods of assessment appropriate to the age, development, and characteristics of children; to interpret assessment results accurately; and to integrate information gained from assessments into instructional planning.

GUIDELINE 5

PRESERVICE PROGRAMS SHOULD INCLUDE STUDY OF CURRENT RESEARCH FINDINGS CONCERNING TEACHING, LEARNING, CLASSROOM MANAGEMENT, AND EFFECTIVE SCHOOLING.

Indicators

5a. Programs should incorporate the content of prospective elementary teachers' coursework, readings, school visitation, and library-based projects that reflect an up-to-date acquaintance with and availability to prospective elementary teachers of the current findings of research on teaching, learning, classroom management, and effective elementary schools.

5b. Programs should develop a range of teaching strategies based upon teacher effectiveness research.

5c. Programs should incorporate research on effective practice as applied to culturally diverse populations.

5d. Programs should incorporate research on effective practice as applied to exceptional student populations.

GUIDELINE 6

PRESERVICE PROGRAMS SHOULD PROVIDE OPPORTUNITIES FOR PROSPECTIVE ELEMEMTARY TEACHERS TO WORK WITH PARENTS ON PROCESSES FOR IMPROVING THEIR CHILDREN'S PROGRESS.

Indicators

6a. Programs should emphasize that one of the most important variables in working with parents is the attitudes of the administrators and teachers toward parents and should provide strategies on cultivating appropriate attitudes.

6b. Programs should provide prospective elementary teachers with the techniques to examine personal values toward parents with varying socioeconomic backgrounds, and should provide tools for interacting in a positive and accepting manner.

6c. Programs should provide strategies on communicating with parents in a positive manner.

6d. Programs should provide strategies to determine appropriate educational techniques for the development of parents to be able to assist their children.

CLUSTER III - METHODS

A major problem in the current preparation of prospective elementary teachers is the separation among content, methodology, and children's learning theory courses. The guidelines presented are based on the assumption that an integration must occur among the content, methodology, and the child. Content must have a bridge, via the teacher's teaching/learning strategies, to the learner and the learner's environment.

GUIDELINE 7

PRESERVICE PROGRAMS SHOULD PROVIDE OPPORTUNITIES TO STUDY, OBSERVE, AND PRACTICE A RANGE OF TEACHING STRATEGIES AND TECHNIQUES, EMPHASIZING THE PROCESS OF TRANSLATING THE KNOWLEDGE BASES INTO DEVELOPMENTALLY APPROPRIATE ACTIVITIES FOR ALL CHILDREN.

Indicators

7a. Programs should prepare prospective elementary teachers to use the knowledge bases within the disciplines as well as through interdisciplinary formats.

7b. Programs should provide study and practice in the use of a variety of questioning techniques and their effect.

7c. Programs should provide systematic feedback and coaching to increase prospective elementary teachers' intentional and effective use of strategies to promote learning.

GUIDELINE 8

PRESERVICE PROGRAMS SHOULD PREPARE PROSPECTIVE ELEMENTARY TEACHERS TO PROVIDE CHILDREN WITH A VARIETY OF EXPERIENCES THAT DEMONSTRATE VARIED APPROACHES TO KNOWLEDGE BUILDING IN DIFFERENT CONTENT AREAS.

Indicators

8a. Programs should provide systematic observation and practice of activities that stimulate problem-solving and critical-thinking skills across disciplines.

8b. Programs should provide study and experiences in teaching skills in ways that are integrated with content areas.

8c. Programs should prepare prospective elementary teachers to adapt materials, instruction, and assessment methods to a variety of approaches to knowledge building.

GUIDELINE 9

PRESERVICE PROGRAMS SHOULD BUILD THE PROSPECTIVE ELEMENTARY TEACHER'S CAPACITY TO ORGANIZE INSTRUCTION FOR CHILDREN.

Indicators

9a. Programs should prepare prospective elementary teachers to include the use of alternative techniques for adapting to children of diverse cultural backgrounds as well as to children who have special learning needs.

9b. Programs should prepare prospective elementary teachers to assess a variety of learning needs.

9c. Programs should prepare prospective elementary teachers to organize and manage varied learning groups simultaneously.

9d. Programs should prepare prospective elementary teachers to select methods of assessment appropriate to the age, development, and characteristics of children; to interpret assessment results accurately; and to integrate information gained from assessments into instructional planning.

9e. Programs should provide observation and field experiences in exemplary classrooms and schools that demonstrate varied organizational structures and serve children with varied learning needs.

CLUSTER IV - CLINICAL EDUCATION

Clinical experiences should continue to be a major requirement in the preparation of prospective elementary teachers. The prospective elementary teacher should have exposure to field experiences early in the program and this exposure should be continuous throughout the program.

> ***Each prospective elementary teacher's clinical experience should be in a variety of K-6 settings to include both primary and intermediate grade levels.*** *Opportunities should be provided to the prospective elementary teacher for preprofessional field experiences in his/her freshman and sophomore years. These experiences should include working with children in various settings, such as Boy Scouts, Girl Scouts, community services, museums, nature preserves, parks and recreation centers, preschool and child care centers, and public and private elementary schools, among others.*

GUIDELINE 10

PROGRAMS SHOULD SYSTEMATICALLY PROVIDE PROSPECTIVE ELEMENTARY TEACHERS WITH EARLY AND CONTINUOUS OPPORTUNITIES FOR FIELD-BASED INTERACTIONS WITH CHILDREN AND TO COLLECT DATA IN ORDER TO ASSIST THEM IN THE STUDY OF TEACHING AND THEIR OWN PERFORMANCE.

Indicators

10a. Programs should provide field experiences which include practice in the use of a variety of assessment and evaluation methods.

10b. Programs should provide relevant coaching and feedback to prospective elementary teachers in clinical/field settings, by linking appropriate data with specific competency criteria.

10c. Programs should ensure that cooperating teachers and field supervisors are well qualified and trained to work with adults in clinical supervision.

GUIDELINE 11

PRESERVICE PROGRAMS SHOULD PROVIDE A WELL-PLANNED, SUPERVISED SEQUENCE OF VARIED CLINICAL/FIELD EXPERIENCES THAT CONNECT COURSE CONTENT WITH ELEMENTARY SCHOOL PRACTICE. PROGRAMS SHOULD INCORPORATE THE EXPERIENCE OF PRACTITIONERS INTO THE DEVELOPMENT OF CURRICULUM AND RESEARCH AND PROVIDE ASSISTANCE TO FIRST-YEAR GRADUATES. SUCH OPPORTUNITIES SHOULD OCCUR EARLY IN THE PROGRAM AND BE CONTINUOUS THROUGHOUT IT.

Indicators

11a. The program's content should be relevant to the field experiences; sequencing should be coordinated to directly link areas of theory and practice.

11b. Clinical/field experiences should include a variety of formats and roles, allowing prospective elementary teachers opportunities to observe, analyze, plan, practice, and evaluate.

11c. The student teaching component should be preceded by field experiences sequenced to incorporate increasing levels of participation and responsibility.

11d. The student teaching experiences should provide a sufficient period of time and levels of responsibility to prepare prospective elementary teachers for professional teaching roles.

11e. Programs should provide placements in a variety of K-6 settings, including both primary and intermediate levels, where prospective elementary teachers can practice varied styles and appropriate models of teaching.

11f. Sites for field experiences should be carefully selected to provide exposure to a variety of elementary school settings, including experiences with culturally diverse and exceptional populations, and children of different ages.

11g. Field experiences should be carefully supervised; the student teaching component should be conducted under a written agreement that specifies the roles, responsibilities, and expectations of university and school-based supervisors and the prospective elementary teacher.

11h. Programs should provide systematic assistance to graduates in their first year of teaching, as outlined in a written plan.

11i. Programs should incorporate the experience of practitioners and utilize information from follow-up studies of graduates for program planning and evaluation and for developing a research agenda.

11j. Programs should provide field experiences which include practice using and integrating computers and other technologies for instruction.

RECOMMENDATION 4

AN ALTERNATE TEACHER PREPARATION PROGRAM SHOULD BE ESTABLISHED FOR GRADES K-6 ELEMENTARY TEACHERS IN FLORIDA. GUIDELINES SHOULD BE DEVELOPED FOR ALTERNATE TEACHER PREPARATION PROGRAMS FOR GRADES K-6 ELEMENTARY TEACHERS.

RATIONALE: In 1984, the Florida Legislature mandated an Alternate Teacher Preparation Program (ATP) to recruit and prepare qualified individuals for a teaching career. Although the statute was intended to attract potential teachers from the professions, colleges of arts and sciences, professional schools, persons retiring from military, business, and industrial careers, it is also a possibility that the alternate preparation program is an option for qualified persons who may be employed as degreed paraprofessionals in the schools. The alternate preparation program is currently limited to the secondary level, particularly in the critical shortage areas identified and specified in Section 231.172(1), Florida Statutes.

An evaluation of the Alternate Teacher Preparation Program in 1988-89 by consultants for the Bureau of Teacher Education, Florida Department of Education, showed that teachers gave the program high marks for relevance and practical value.

In 1988, the Education Standards Commission conducted a comprehensive analyses of the effectiveness of Florida's Alternate Preparation Program by interviewing the coordinators and completers of the programs. The coordinators indicated that principals and supervisors were satisfied with the performance of the participants of the alternate preparation programs.

It should be noted that the Commission believes that guidelines for alternate teacher preparation programs in elementary education must be carefully and thoughtfully developed. The Commission understands the need for only qualified persons to teach the youth in our elementary schools.

Therefore, the Commission does not make this recommendation without underscoring the necessity to have guidelines developed that will protect the interest of the children. **It should also be stressed that the Commission is not advocating that alternate preparation programs in elementary education be modeled after the current programs offered in secondary education, in either content or length of programs.** The elementary teacher is as unique as the secondary teacher, and therefore, alternate preparation programs must be designed accordingly. The Commission is recommending that the guidelines for alternate preparation programs in elementary education be based on the same clusters put forth in Recommendation 3: Content, Professional Preparation, Methods, and Clinical Education. As discussed in the Commission's report, Teachers for Florida's Classrooms: The Experimental Alternate Certification Program for Secondary Teachers (p. 15, 1988), AACTE's prototype components for alternate teacher preparation programs offer quality alternatives for preparing teachers and should also be considered when developing guidelines.

RECOMMENDATION 5

IT IS ESSENTIAL THAT THERE BE STRONG COLLABORATION BETWEEN THE COLLEGES OF EDUCATION, COLLEGES OF ARTS AND SCIENCES, COMMUNITY COLLEGES, SCHOOL DISTRICTS, PRIVATE INSTITUTIONS, AND INVOLVED DIVISIONS OF THE FLORIDA DEPARTMENT OF EDUCATION.

RATIONALE: Successful implementation of the fundamental changes advocated in these recommendations requires strong collaboration between all of the institutions and agencies involved.

> *It is clear that community colleges play a major role in teacher education in Florida. This is made evident by the fact that 65.5% of the randomly sampled transcripts from recently graduated persons certificated in elementary education attended a community college prior to entering a four year institution to complete their preservice elementary education program.*

The need for collaboration is exacerbated even more by the fact that the majority of courses taken in mathematics and science by the randomly sampled transcripts of persons certified in elementary education, were taken at the lower level to meet general education requirements. Thus, it becomes evident that the current trend for many of our in-state graduated elementary teachers is to take their content courses, particularly in mathematics and science, at Florida's community colleges.

In addition, public schools need to be a part of this collaboration since school personnel are knowledgeable about the strengths and weaknesses of the practicing teachers. School district personnel can assist in the preparation of prospective elementary teachers by helping to identify best practices of current teachers instructing in exemplary programs.

If elementary preservice programs are going to prepare teachers to move beyond facts to developing curricula, to problem-solving and critical thinking skills, experiences must be provided which model effective teaching strategies. These models must demonstrate the manipulation of information and processes that teachers should emulate when re-presenting concepts to young children and providing learning experiences appropriate to primary and intermediate children in elementary schools. The Commission recognizes the importance of this kind of teaching and learning and that it must be demonstrated in appropriate courses taught at the community colleges and the universities.

Thus, the Commission sees many issues regarding programs, processes, and experiences that should be provided to all students in preservice elementary education programs which necessitate cooperation, articulation, and a continuous working partnership between all of the entities which are involved in providing preservice preparation programs. **Of particular importance is that the two relevant institutions are in agreement, both in policy and in practice, concerning requirements and that they provide the programs and experiences to efficiently and effectively prepare prospective elementary teachers.**

The Commission believes that stronger collaboration and support which encompases more agencies should become the standard operating procedure to accomplish the task at hand.

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APPENDICES

APPENDIX A: SURVEY ON THE PREPARATION OF ELEMENTARY TEACHERS

APPENDIX B: STATE BOARD OF EDUCATION RULE 6A-10.030, FLORIDA ADMINISTRATIVE CODE, OTHER ASSESSMENT PROCEDURES FOR COLLEGE-LEVEL COMMUNICATION AND COMPUTATION SKILLS

APPENDIX A

FLORIDA DEPARTMENT OF EDUCATION
Betty Castor
Commissioner of Education

EDUCATION STANDARDS COMMISSION

July 5, 1989

M E M O R A N D U M

TO: Elementary Principals

FROM: Doretha B. Fedrick, Chair
Education Standards Commission

SUBJECT: Survey

The State Board of Education has directed the Education Standards Commission to conduct a study on the preparation of elementary teachers. One focus of this study will be the perceptions of practitioners regarding teacher preparation. Commissioner Castor was particularly interested in what elementary principals think about this topic.

Attached is a survey designed to collect your ideas about the training of elementary teachers. The survey should take approximately fifteen minutes to complete. Your cooperation in completing and returning this document will enhance the success of this study.

Your continued efforts to create quality learning opportunities for the children of Florida are greatly appreciated.

Attachment

CSM/c

Tallahassee, Florida 32399

Affirmative action/equal opportunity employer

SURVEY ON THE PREPARATION OF ELEMENTARY TEACHERS

Demographic Information

1. *County in which your school is located:*

2. *Number of years as a classroom teacher:*

   Elementary: *Middle:* *High:*

   Other (please describe):

3. *Number of years as an administrator:*

   Principal: *Assistant Principal:*

   Other (please describe):

Survey Questions

SECTION A: Respond to the following statements with respect to recent graduates from a university program in elementary education. Indicate whether you Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD). Circle your answer for each question.

1. *Elementary teachers are well prepared to teach mathematics.*	*SA*	*A*	*D*	*SD*
2. *Elementary teachers are well prepared to teach science.*	*SA*	*A*	*D*	*SD*

3.	*Elementary teachers are well prepared to use computers to enhance student learning.*	*SA*	*A*	*D*	*SD*
4.	*Elementary teachers are well prepared to teach geography.*	*SA*	*A*	*D*	*SD*
5.	*Elementary teachers are able to develop curricula in mathematics.*	*SA*	*A*	*D*	*SD*
6.	*Elementary teachers are able to teach mathematics in a manner that emphasizes problem solving.*	*SA*	*A*	*D*	*SD*
7.	*Elementary teachers are able to develop curricula in science.*	*SA*	*A*	*D*	*SD*
8.	*Elementary teachers are able to teach earth, life, and physical science as a coherent sequence of core topics.*	*SA*	*A*	*D*	*SD*
9.	*Elementary teachers are able to teach science in a hands-on and problem centered manner.*	*SA*	*A*	*D*	*SD*
10.	*Elementary teachers are able to develop curricula in computer education.*	*SA*	*A*	*D*	*SD*
11.	*Elementary teachers are able to integrate computer technology with other subjects such as mathematics, science, and geography.*	*SA*	*A*	*D*	*SD*

SECTION B: Provide concise answers to questions 12 and 13.

12. List the strengths of recently graduated teachers with respect to:

Teaching elementary mathematics:

Teaching elementary science:

Teaching elementary geography:

Using computers to enhance student learning:

13. List the weaknesses of recently graduated teachers with respect to:

Teaching elementary mathematics:

Teaching elementary science:

Teaching elementary geography:

Using computers to enhance learning:

SECTION C: Provide concise answers to questions 14 and 15.

14. Suggest improvements in university programs to prepare teachers to:

Teach mathematics:

Teach science:

Teach geography:

Use computers to enhance learning:

15. Provide other comments and suggestions related to the preparation of teachers to teach mathematics, science, and geography, and the use of computers to enhance learning of elementary children.

SECTION D: Provide concise answers to questions 16 and 17.

16. *What are the most important problems you face in implementing exemplary programs in mathematics, science, geography, and the use of computers to enhance the learning of elementary children?*

Mathematics:

Science:

Geography:

Using computers to enhance learning:

17. *What are the three most important characteristics of exemplary elementary teachers of mathematics, science, and geography?*

Mathematics:

Science:

Geography:

Thank You.

APPENDIX B

6A-10.030 Other Assessment Procedures for College-Level Communication and Computation Skills.

(1) In addition to tests that may be adopted by the State Board to measure student achievement in college-level communication and computation skills, pursuant to Section 229.053(2)(d), Florida Statutes, other assessment procedures shall be measured by completion of coursework in English and mathematics.

(2) Prior to receipt of an Associate of Arts degree from a public community college or university or prior to entry into the upper division of a public university, a student shall complete successfully the following:

(a) Twelve (12) semester hours of English coursework in which the student is required to demonstrate writing skills. For the purposes of this rule, an English course is defined as any semester-length course within the general study area of the humanities in which the student is required to produce written work of at least six thousand (6,000) words.

(b) Six (6) semester hours of mathematics coursework at the level of college algebra or higher. For the purposes of this rule, applied logic, statistics and other such computation coursework which may not be placed within a mathematics department may be used to fulfill three (3) hours of the six (6) hours required by this section.

For the purposes of this rule, a grade of C or higher shall be considered successful completion.

(c) Students awarded college credit in English based on their demonstration of writing skills through dual enrollment, advanced placement, or international baccalaureate instruction pursuant to Rule 6A-10.024, FAC, and students awarded college credit based on their demonstration of mathematics skills at the level of college algebra or higher through one (1) or more of the acceleration mechanisms in Rule 6A-10.024, FAC, shall be considered to have satisfied the requirements in Rule 6A-10.030(2), FAC, to the extent of the college credit awarded.

(3) Exemptions and waivers.

(a) Any student who completes the first six (6) hours of the English coursework required by this rule with a grade point average of 4.0 may waive completion of the remaining six (6) hours until after entry into the upper division of a university and shall be considered eligible for an Associate of Arts degree, notwithstanding the provisions of Rule 6A-10.030(2)(a), FAC.

(b) Any public community college or university desiring to exempt its students from the requirements of Rule 6A-10.030(2), FAC, shall submit an alternative plan to the State Board of Community Colleges or Board of Regents, respectively. Upon approval of the plan by the respective board, the plan shall be submitted to the State Board. Upon approval by the State Board, said plan shall be deemed effective in lieu of the requirements of Rule 6A-10.030(2), FAC.

Specific Authority 229.053(1), (2)(d) FS. Law Implemented 229.053(2)(d) FS., Section 15, Chapter 87-212, Laws of Florida. History - New 10-15-82, Formerly 6A-10.30, Amended 6-8-88.

4. Identifying regions of the coordinate plane which correspond to specified conditions.

(i) Demonstrating understanding of statistical concepts including probability by all of the following skills:

1. Recognizing the normal curve and its properties.

2. Recognizing samples that are representative of a given population.

3. Identifying the probability of a specified outcome in an experiment.

(j) Demonstrating understanding of logical-reasoning concepts by all of the following skills:

1. Identifying simple and compound statements and their negations.

2. Determining equivalence or non-equivalence of statements.

3. Drawing logical conclusions from data.

4. Recognizing that an argument may not be valid even though its conclusion is true.

5. Distinguishing fallacious arguments from non-fallacious ones.

6. Recognizing proof by contradiction.

(k) Demonstrating understanding of computer-technology concepts by all of the following skills:

1. Identifying characteristics of tasks which computers perform well.

2. Identifying the human functions necessary to utilize computers.

3. Identifying possible abuses of computer use.

(l) Generalizing and selecting applicable generalizations in arithmetic by both of the following skills:

1. Inferring relations between numbers in general by examining particular number pairs.

2. Selecting applicable properties for performing arithmetic calculations.

(m) Generalizing and selecting applicable generalizations in geometry and measurement by both of the following skills:

1. Inferring formulas for measuring geometric figures.

2. Selecting applicable formulas for computing measures of geometric figures.

(n) Generalizing and selecting applicable generalizations in algebra by both of the following skills:

1. Inferring relations among variables.

2. Selecting applicable properties for solving equations and inequalities.

(o) Generalizing and selecting applicable generalizations in statistics, including probability, by inferring relations and making accurate predictions from studying particular cases.

(p) Generalizing and selecting applicable generalizations in logical reasoning by both of the following skills:

1. Inferring valid reasoning patterns and expressing them with variables.

2. Selecting applicable rules for transforming statements without affecting their meaning.

(q) Demonstrating proficiency for solving problems in the area of arithmetic by both of the following skills:

1. Solving real-world problems which do not require the use of variables.

2. Solving problems that involve the structure and logic of arithmetic.

(r) Demonstrating proficiency for solving problems in the area of geometry and measurement by both the following skills:

1. Solving real-world problems involving perimeters, areas, volumes of geometric figures.

2. Solving real-world problems involving the Pythagorean property.

(s) Demonstrating proficiency for solving problems in the area of algebra by both of the following skills:

1. Solving real-world problems involving the use of variables, aside from commonly used geometric formulas.

2. Solving problems that involve the structure and logic of algebra.

(t) Demonstrating proficiency for solving problems in the area of statistics, including probability for both of the following skills:

1. Solving real-world problems involving the normal curve.

2. Solving real-world problems involving probabilities.

(u) Demonstrating awareness of the ways in which logical reasoning is used to solve problems by drawing logical conclusions when facts warrant them.

(3) The Articulation Coordinating Committee shall file with the Commissioner and the State Board, on or before November 30 of each odd numbered year, its recommendations for changes, if any, in the above definitions of college-level communication and computation skills.

(4) This rule shall expire on July 31, 1987.

Specific Authority 229.053(1)(2)(4) FS. Law Implemented 229.053(2)(4), 229.551(3)(5) FS. History - New 9-3-81, Amended 5-25-82, Formerly 6A-10.31, Amended 4-10-86.

6A-10.0310 College-Level Communication and Computation Skills. The communication and computation skills identified herein, pursuant to Section 229.053(2)(4), Florida Statutes, are associated with successful performance of students in college programs through the baccalaureate level.

(1) The following skills, by designated category, are defined as college-level communication skills:

(a) Reading with literal comprehension includes all of the following skills:

1. Recognizing main ideas in a given passage.
2. Identifying supporting details.
3. Determining meaning of words on the basis of context.

(b) Reading with critical comprehension includes all of the following skills:
1. Recognizing the author's purpose.
2. Identifying the author's overall organizational pattern.
3. Distinguishing between statement of fact and statement of opinion.
4. Detecting bias.
5. Recognizing author's tone.
6. Recognizing explicit and implicit relationships within sentences.
7. Recognizing explicit and implicit relationships between sentences.
8. Recognizing valid arguments.
9. Drawing logical inferences and conclusions.

(c) Listening with literal comprehension includes all of the following skills:
1. Recognizing main ideas.
2. Identifying supporting details.
3. Recognizing explicit relationships among ideas.
4. Recalling basic ideas, details, or arguments.

(d) Listening with critical comprehension includes all of the following skills:
1. Perceiving the speaker's purpose.
2. Perceiving the speaker's organization of ideas and information.
3. Discriminating between statements of fact and statements of opinion.
4. Distinguishing between emotional and logical arguments.
5. Detecting bias.
6. Recognizing the speaker's attitude.
7. Synthesizing by drawing logical inferences and conclusions.
8. Evaluating objectively.

(e) Composing units of discourse providing ideas and information suitable for purpose and audience includes all of the following skills:
1. Selecting a subject which lends itself to development.
2. Determining the purpose and the audience for writing.
3. Limiting the subject to a topic which can be developed within the requirements of time, purpose, and audience.
4. Formulating a thesis or main idea statement which reflects the purpose and the focus.
5. Developing the thesis or main idea statement by all of the following:
a. Providing adequate support which reflects the ability to distinguish between generalized and concrete evidence.
b. Arranging the ideas and supporting details in an organizational pattern appropriate to the purpose and the focus.
c. Writing unified prose in which all supporting material is relevant to the thesis or main idea statement.
d. Writing coherent prose, providing effective transitional devices which clearly reflect the organizational pattern and the relationships of the parts.

(f) Transmitting ideas and information in effective written language which conforms to the conventions of standard American English includes all of the following skills:
1. Demonstrating effective word choice by all of the following:
a. Using words which convey the denotative and connotative meanings required by context.
b. Avoiding inappropriate use of slang, jargon, cliches, and pretentious expressions.
c. Avoiding wordiness.
2. Employing conventional sentence structure by all of the following:
a. Placing modifiers correctly.
b. Coordinating and subordinating sentence elements according to their relative importance.
c. Using parallel expressions for parallel ideas.
d. Avoiding fragments, comma splices, and fused sentences.
3. Employing effective sentence structure by all of the following:
a. Using a variety of sentence patterns.
b. Avoiding unnecessary use of passive construction.
4. Observing the conventions of standard American English grammar and usage by all of the following:
a. Using standard verb forms.
b. Maintaining agreement between subject and verb, pronoun and antecedent.
c. Using proper case forms.
d. Maintaining a consistent point of view.
e. Using adjectives and adverbs correctly.
5. Using standard practice for spelling, punctuation, and capitalization.
6. Revising, editing, and proofreading units of written discourse to assure clarity, consistency, and conformity to the conventions of standard American English.

(g) Speaking involves composing the message, providing ideas and information suitable to topic, purpose and audience which includes all of the following skills:
1. Determining the purpose of the oral discourse.
2. Choosing a topic and restricting it according to purpose and audience.
3. Fulfilling the purpose by the following:
a. Formulating a thesis or main idea statement.
b. Providing adequate support material.
c. Organizing suitably.
d. Using appropriate words.
e. Using effective transitions.

(h) Speaking involves transmitting the message, using oral delivery skills suitable to the audience and the occasion by all of the following skills:
1. Employing vocal variety in rate, pitch, and intensity.
2. Articulating clearly.
3. Employing the level of American English appropriate to the designated audience.

4. Demonstrating nonverbal behavior which supports the verbal message with eye contact and appropriate posture, gestures, facial expressions, and body movements.

(2) The following skills, by designated category, are defined as college-level computation skills:

(a) Demonstrating mastery of all of the following arithmetic algorithms:

1. Adding, subtracting, multiplying, and dividing rational numbers.

2. Adding, subtracting, multiplying, and dividing rational numbers in decimal form.

3. Calculating percent increase and percent decrease.

(b) Demonstrating mastery of all of the following geometric and measurement algorithms:

1. Rounding measurements to the nearest given unit of the measuring device used.

2. Calculating distances, areas, and volumes.

(c) Demonstrating mastery of all of the following algebraic algorithms:

1. Adding, subtracting, multiplying, and dividing real numbers.

2. Applying the order-of-operations agreement to computations involving numbers and variables.

3. Using scientific notation in calculations involving very large or very small measurements.

4. Solving linear equations and inequalities.

5. Using given formulas to compute results, when geometric measurements are not involved.

6. Finding particular values of a function.

7. Factoring a quadratic expression.

8. Finding the roots of a quadratic equation.

(d) Demonstrating mastery of all of the following statistical algorithms, including some from probability:

1. Identifying information contained in bar, line, and circle graphs.

2. Determining the mean, median, and mode of a set of numbers.

3. Counting subsets of a given set.

(e) Demonstrating mastery of logical-reasoning algorithms by deducing facts of set inclusion or set non-inclusion from a diagram.

(f) Demonstrating understanding of arithmetic concepts by all of the following skills:

1. Recognizing the meaning of exponents.

2. Recognizing the role of the base number in determining place value in the base-ten numeration system and in systems that are patterned after it.

3. Identifying equivalent forms of positive rational numbers involving decimals, percents, and fractions.

4. Determining the order relation between magnitudes.

5. Identifying a reasonable estimate of a sum, average, or product of numbers.

(g) Demonstrating understanding of geometric and measurement concepts by all of the following skills:

1. Identifying relationships between angle measures.

2. Classifying simple plane figures by recognizing their properties.

3. Recognizing similar triangles and their properties.

4. Identifying appropriate types of measurement for geometric objects.

(h) Demonstrating understanding of algebraic concepts by all of the following skills:

1. Recognizing and using properties of operations.

2. Determining whether a particular number is among the solutions of a given equation or equality.

3. Recognizing statements and conditions of proportionality and variation.

4. Identifying regions of the coordinate plane which correspond to specified conditions.

(i) Demonstrating understanding of statistical concepts including probability by all of the following skills:

1. Recognizing properties and interrelationships among the mean, median, and mode in a variety of distributions.

2. Choosing the most appropriate procedure for selecting an unbiased sample from a target population.

3. Identifying the probability of a specified outcome in an experiment.

(j) Demonstrating understanding of logical-reasoning concepts by all of the following skills:

1. Identifying simple and compound statements and their negations.

2. Determining equivalence or non-equivalence of statements.

3. Drawing logical conclusions from data.

4. Recognizing that an argument may not be valid even though its conclusion is true.

(k) Generalizing and selecting applicable generalizations in arithmetic by both of the following skills:

1. Inferring relations between numbers in general by examining particular number pairs.

2. Selecting applicable properties for performing arithmetic calculations.

(l) Generalizing and selecting applicable generalizations in geometry and measurement by both of the following skills:

1. Inferring formulas for measuring geometric figures.

2. Selecting applicable formulas for computing measures of geometric figures.

(m) Generalizing and selecting applicable generalizations in algebra by both of the following skills:

1. Inferring relations among variables.

2. Selecting applicable properties for solving equations and inequalities.

(n) Generalizing and selecting applicable generalizations in statistics, including probability, by inferring relations and

making accurate predictions from studying particular cases.

(o) Generalizing and selecting applicable generalizations in logical reasoning by both of the following skills:

1. Inferring valid reasoning patterns and expressing them with variables.

2. Selecting applicable rules for transforming statements without affecting their meaning.

(p) Demonstrating proficiency for solving problems in the area of arithmetic by the following skills:

1. Solving real-world problems which do not require the use of variables and which do not involve percent.

2. Solving real-world problems which do not require the use of variables and which do require the use of percent.

3. Solving problems that involve the structure and logic of arithmetic.

(q) Demonstrating proficiency for solving problems in the area of geometry and measurement by both the following skills:

1. Solving real-world problems involving perimeters, areas, volumes of geometric figures.

2. Solving real-world problems involving the Pythagorean property.

(r) Demonstrating proficiency for solving problems in the area of algebra by both of the following skills:

1. Solving real-world problems involving the use of variables, aside from commonly used geometric formulas.

2. Solving problems that involve the structure and logic of algebra.

(s) Demonstrating proficiency for solving problems in the area of statistics, including probability for both of the following skills:

1. Solving real-world problems involving the normal curve.

2. Solving real-world problems involving probabilities.

(t) Demonstrating awareness of the ways in which logical reasoning is used to solve problems by drawing logical conclusions when facts warrant them.

(3) The Articulation Coordinating Committee shall file with the Commissioner and the State Board, on or before November 30 of each odd numbered year, its recommendations for changes, if any, in the above definitions of college-level communication and computation skills.

(4) This rule will take effect August 1, 1987.

Specific Authority 229.053(1)(2)(3) FS. Law Implemented 229.053(1)(2)(3), 229.551(3)(h) FS. History - New 8-1-87.

6A-10.0311 Assessment of Student Attainment of College-Level Communication and Computation Skills.

(1) The skills in Rule 6A-10.0310, FAC, shall be used by the Articulation Coordinating Committee as the basis for the development of specifications for test items.

(2) The specifications shall be used by the Articulation Coordinating Committee as the basis for the development of tests and other assessment procedures to measure the level of student attainment of the skills.

(3) The College-Level Academic Skills Test, an achievement test developed by the Department pursuant to Section 229.551 (3)(h), Florida Statutes, to measure the level of attainment of college-level communication and computation skills listed in Rule 6A-10.0310, FAC, is approved and designated for use in community colleges and state universities. Scores on the test shall be reported on the score scale which was established by the Department in the October, 1982 administration in which the statewide mean scores were 300 on the reading, writing, and computation subtests and 4.7 on the essay subtest.

(4) Admission criteria for the College-Level Academic Skills Test shall be specified by the Commissioner in the Test Administration Plan.

(5) A person required to take the College-Level Academic Skills Test who has a record of physiological disorder(s) which substantially impairs that person's visual, auditory, manual or speaking abilities or who has a record of a learning disability shall be deemed to have satisfied any requirement to present a score on any subtest which has not been modified in administration so as best to ensure that the performance of the person on the subtest accurately reflects the person's achievement of the skill being measured, rather than the person's impaired abilities. The test modifications may include but are not limited to the following:

(a) Flexible scheduling. The person may be administered a subtest during several brief sessions, so long as all testing is completed on the test administration date.

(b) Flexible setting. The person may be administered a subtest individually or in a small group setting by a proctor rather than in a classroom or auditorium setting.

(c) Recording of answers. The person may mark answers in a test booklet, type the answers by machine, or indicate selected answers to a test proctor. The proctor may then transcribe the person's responses onto a machine-scorable answer sheet.

Florida Department of Education
Betty Castor, Commissioner
Tallahassee, Florida
An affirmative action/equal opportunity employer

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